❑ MN102L59D

Type	MN102L59D	MN102LF59D
Internal ROM type	Mask ROM	FLASH
ROM (byte)	64K	
RAM (byte)	2K	
Package (Lead-free)	LQFP064-P-1414	LQFP064-P-1414 (ES (Engineering Sample) available)
Minimum Instruction Execution Time	[With main clock operated] 100 ns (at 4.5 V to 5.5 V, 5 MHz externally, multiplied by 4 internally)	

■ Interrupts

RESET, Watchdog, Timer counter 0 to 11, External 0 to 5, Serial ch.0 tra nsfer finish, Serial ch.1 tra nsfer finish, /NMI pin, A/D conversion finish

■ Timer Counter

Timer counter 0 : 8-bit × 1 (timer output, event count)
Clock source..... 1/1, 1/64, 1/128 of system clock frequency; external clock
Interrupt source ..... underflow of timer counter 0

Timer counter 1 : 8-bit × 1 (timer output, event count, A/D conversion start up)
Clock source..... 1/1, 1/64 of system clock frequency; external clock; timer counter 0 output
Interrupt source ..... underflow of timer counter 1

Timer counter 2 : 8-bit × 1 (timer output, event count)
Clock source..... system clock; external clock; timer counter 0, 1 output
Interrupt source ..... underflow of timer counter 2

Timer counter 3 : 8-bit × 1 (interval timer, UART baud rate generator)
Clock source..... 1/1, 1/2, 1/64 of system clock frequency; timer counter 0 output
Interrupt source ..... underflow of timer counter 3

Timer counter 4 : 8-bit × 1 (interval timer)
Clock source..... 1/1, 1/64, 1/128 of system clock frequency; timer counter 0 output
Interrupt source ..... underflow of timer counter 4

Timer counter 5 : 8-bit × 1 (interval timer)
Clock source..... 1/1, 1/64 of system clock frequency; timer counter 0, 4 output
Interrupt source ..... underflow of timer counter 5

Timer counter 6 : 16-bit × 1 (timer output, event count)
Clock source..... 1/1, 1/128 of system clock frequency; external clock; timer counter 0 output
Interrupt source ..... underflow of timer counter 6

Timer counter 7 : 16-bit × 1 (timer output, event count)
Clock source..... 1/1, 1/128 of system clock frequency; external clock; timer counter 0 output
Interrupt source ..... underflow of timer counter 7

Timer counter 8 : 8-bit × 1 (timer output, event count, simple PWM output)
Clock source..... 1/2, 1/8 of system clock frequency; external clock; timer counter 0 output
Interrupt source ..... underflow of timer counter 8

Timer counter 9 : 8-bit × 1 (timer output, event count, simple PWM output)
Clock source..... 1/2, 1/8 of system clock frequency; external clock; timer counter 0 output
Interrupt source ..... underflow of timer counter 9

Timer counter 10 : 8-bit × 1
(timer output, simple inverter control [simple 6-phase PWM output])
Clock source..... high-speed clock (after multiplication); 1/1, 1/2, 1/8 of system clock frequency
Interrupt source ..... overflow of timer counter 10

Timer counter 11 : 16-bit updown counter × 1
(highly functional inverter control [simple 6-phase PWM output], A/D conversion start)
Clock source..... high-speed clock (after multiplication); 1/1 of system clock frequency
Interrupt source ..... overflow of timer counter 11; underflow of timer counter 11

Connectable timer counter 0, 1, 2 timer counter 0, 4, 5

■ Serial interface

Serial 0, 1 : 1 to 8-bit × 1 (common use with half-duplex UART, transfer direction of MSB/LSB selectable)

Clock source..... 1/2, 1/4, 1/16 of system clock, 1/2 of timer counter 3, external clock

Half-duplex UART × 2 (common use with serial 0, 1)

■ I/O Pins

I/O	52	Common use : 52 (by bit)

■ A/D converter

10-bit × 12-ch. (with S/H) : 4 channels for common use

■ PWM

16-bit × 2-ch. (commen use with timer counter 6,7)

simple 6-phase PWM output 8-bit × 1-ch.(common use with timer counter 10)

6-phase PWM output 16-bit × 1ch. (timer counter 11)

■ Notes

6-phase PWM output support

■ Electrical Charactreistics (Supply current)

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDDopr	VI = VDD or VSS, output open f = 5 MHz , VDD = 5.0 V			75	mA
Supply current at STOP	IDDS	Pin with pull-up resistor is open all other input pins and Hi-Z state input/output pins are simultaneously applied VDD or VSS level f = 5 MHz , VDD = 5.0 V, output open			50	µA
Supply current at HALT0	IDDH				30	mA

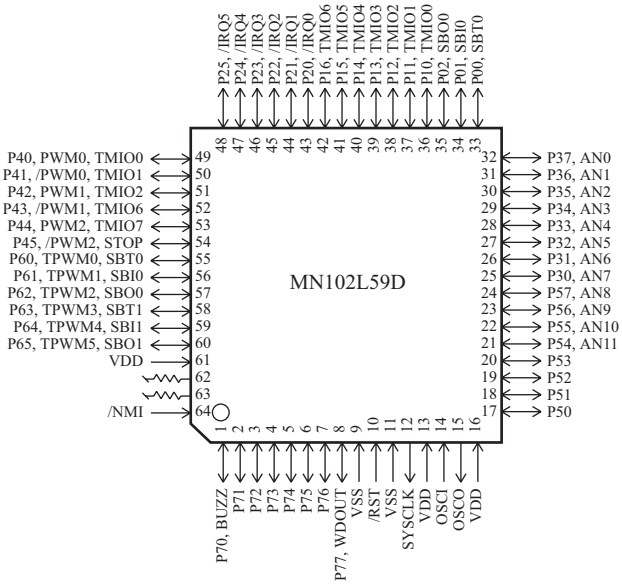
(Ta = –20°C to +85°C, VDD = 5.0V, VSS = 0V)

■ Development tools

In-circuit Emulator

PX-ICE102L00 + PX-PRB102L59-LQFP064-P-1414

■ Pin Assignment



LQFP064-P-1414

Note) The MN102LF59D is manufactured and sold under license agreement with BULL CP8 Inc. Note that MN102LF59D cannot be used as the IC card.

Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products, and no license is granted under any intellectual property right or other right owned by our company or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

(7) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of Matsushita Electric Industrial Co., Ltd. Industrial Co., Ltd.