

□ MN101E30 Series

Type	MN101E30N	MN101E30R	MN101EF30R
Internal ROM type	Mask ROM		FLASH
ROM (byte)	508K	928K	
RAM (byte)	8K		
Package (Lead-free)	QFP100-P-1818B		
Minimum Instruction Execution Time	50 ns (at 2.2 V to 5.5 V, 20 MHz) *: at internal 2, 3, 4, 5, 6, 8, 10 times oscillation used		

■ Interrupts

6 external interrupts. 30 internal interrupts

RESET. NMI. External 0 to 4. Timer 0 to 4. Timer 6. Timer 7 (2 systems). Timer 8 (2 systems). Timer 9 (2 systems). Time base. Serial 0 (2 systems). Serial 1 (2 systems). Serial 2 (2 systems). Serial 3 (2 systems). Serial 4. Serial 5. A/D conversion. Automatic transfer (2 systems). Key interrupt. End of single tone. End of phrase

■ Timer Counter

8-bit timer × 7

- Timer 0Timer pulse output. Event count. Added pulse (2-bit) type PWM output. Remote control carrier output. Simple pulse width measurement. Real time output control
- Timer 1Timer pulse output. Event count. 16-bit cascade connected (timer 0, 1). Timer synchronous output
- Timer 2Timer pulse output. Event count. Added pulse (2-bit) type PWM output. Simple pulse width measurement. 24-bit cascade connected (timer 0, 1, 2). Timer synchronous output. Real time output control
- Timer 3Timer pulse output. Event count. Remote control carrier output. 16-bit cascade connected (timer 2, 3). 32-bit cascade connected (timer 0, 1, 2, 3)
- Timer 4Timer pulse output. Added pulse (2-bit) type PWM output. Event count. Serial transfer clock output. Simple pulse width measurement
- Timer 68-bit freerun timer. Time base timer
- Timer A.....Event count. Baud rate timer. Clock output for peripheral function

16-bit timer × 3

- Timer 7Timer pulse output. Event count. High accuracy PWM. High performance IGBT output (cycle/duty continuous variable). Timer synchronous output. Input capture (both edge available). Real time output control. Double buffer compare register
- Timer 8Timer pulse output. Event count. High accuracy PWM output (cycle/duty continuous variable). Pulse width measurement. Input capture (both edge available). 32-bit cascade connected (timer 7, 8). 32-bit PWM output. Synchronous output event. Double buffer compare register
- Timer 9Timer pulse output. Event count. High accuracy PWM output (cycle/duty continuous variable). Pulse width measurement. Input capture (both edge available). Real time output control. Double buffer compare register

Watchdog timer × 1

■ Serial interface

Synchronous type/UART (full-duplex) × 4: Serial 0 to 3

Synchronous type/Multi-master I²C × 1: Serial 4

I²C slave × 1: Serial 5

■ DMA controller

2 systems. Maximum transfer cycles are 255

Starting factor: External request. Internal event. Software

■ I/O Pins

I/O 85 : Common use. Specified pull-up/pull-down resistor available. Input/output selectable (bit unit)

■ A/D converter

10-bit × 12 channels

■ D/A converter

8-bit × 4 channels. 20-bit × 2 channels. (Sound reproduction:digital output, analog output)

■ Display control function

LCD: 55 segments × 4 commons (Static, 1/2, 1/3, or 1/4 duty) 1/3 bias

Usable if VLC1 ≤ VDD

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.