

□ MN101E31G

Type	MN101E31G	MN101EF31G
Internal ROM type	Mask ROM	FLASH
ROM (byte)	128K	
RAM (byte)	4K	
Package (Lead-free)	LQFP080-P-1414A (Under development)	
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	50 ns (at 2.2 V to 5.5 V, 20 MHz)

■ Interrupts

6 external interrupts, 25 internal interrupts

RESET, Watchdog, External 0 to 4, Timer 0 to 4, Timer 6, Timer 7 (2 systems), Timer 8 (2 systems), Time base, Serial 0 (2 systems), Serial1 (2 systems), Serial 2 (2 systems), Serial 3 (2 systems), Serial 4, Serial 5, A/ D conversion finish, Automatic transfer, Key interrupts

■ Timer Counter

Timer counter 0 : 8-bit × 1

(timer pulse output, event count, added pulse (2-bit) system PWM output, generation of remote control carrier, simple pulse measurement, real time output control)

Timer counter 1 : 8-bit × 1

(timer pulse output, event count, 16-bit cascade connected (timer 0, 1) timer synchronous output event)

Timer counter 2 : 8-bit × 1

(timer pulse output, event count, added pulse (2-bit) system PWM output, simple pulse measurement, 24-bit cascade connected (timer 0, 1, 2), timer synchronous output event, real timer output control)

Timer counter 3 : 8-bit × 1

(timer pulse output, event count, generation of remote control carrier, 16-bit cascade connected (timer 2, 3), 32-bit cascade connected (timer 0, 1, 2, 3))

Timer counter 4 : 8-bit × 1

(timer pulse output, added pulse (2-bit) system PWM output, event count, serial transfer clock, simple pulse measurement)

Timer counter 6 : 8-bit free run timer, time base timer

Timer counter 7 : 16-bit × 1

(timer pulse output, event count, High accuracy PWM, High performance IGBT output (cycle/duty continuous variable) timer synchronous output event, input capture (Both edge available), real timer output control), double buffer compare register

Timer counter 8 : 16-bit × 1

(timer 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 counter A : 8-bit × 1 (event count, Serial transfer clock timer, clock for function (timer, serial, LCD))

Watchdog timer

■ Serial interface

Serial 0 ~ 3 : UART (full duplex) / synchronous × 1

Serial 4 : multi master I²C / synchronous × 1

Serial 5 : I²C slave × 1

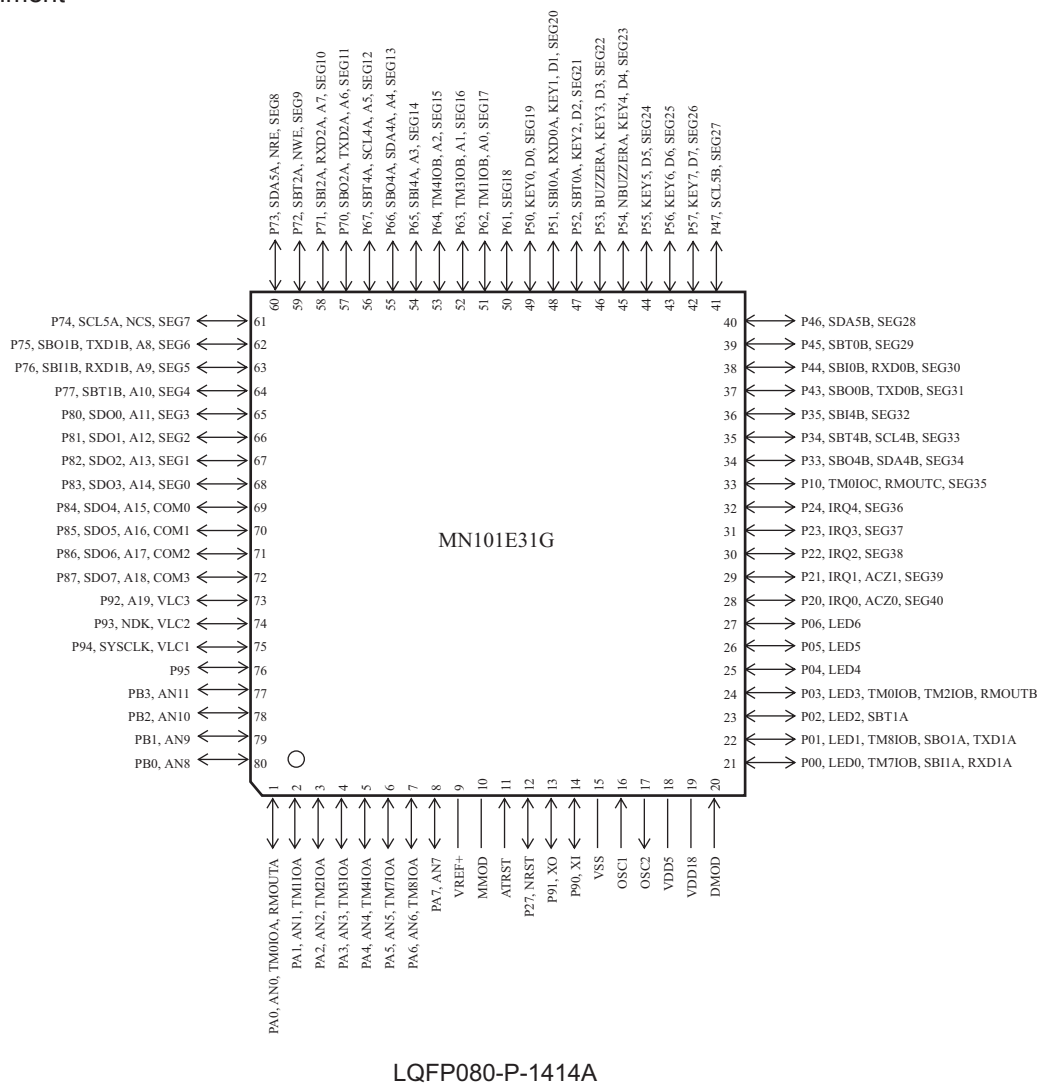
■ DMA controller

1 systems (External request/internal event request/software request maximum transfer cycles are 255)

■ I/O Pins

I/O	70	common use, Specified pull-up/pull-down resistor available, Input/output selectable (bit-unit)
-----	----	--

- A/D converter
10-bit × 12-ch.
- Display control function
LCD
55 segments × 4 commons (static, 1/2, 1/3, 1/4 duty) 1/3 bias
Usable if VLC1 ≤ VDD
- Special Ports
Buzzer output, remote control carrier signal output, high-current drive port
- ROM Correction
Correcting address designation : up to 7 addresses possible
- Development tools
In-circuit Emulator
PX-ICE101E + PRBV101E31-LQFP080-P-1414A (Under development)
- Pin Assignment



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.