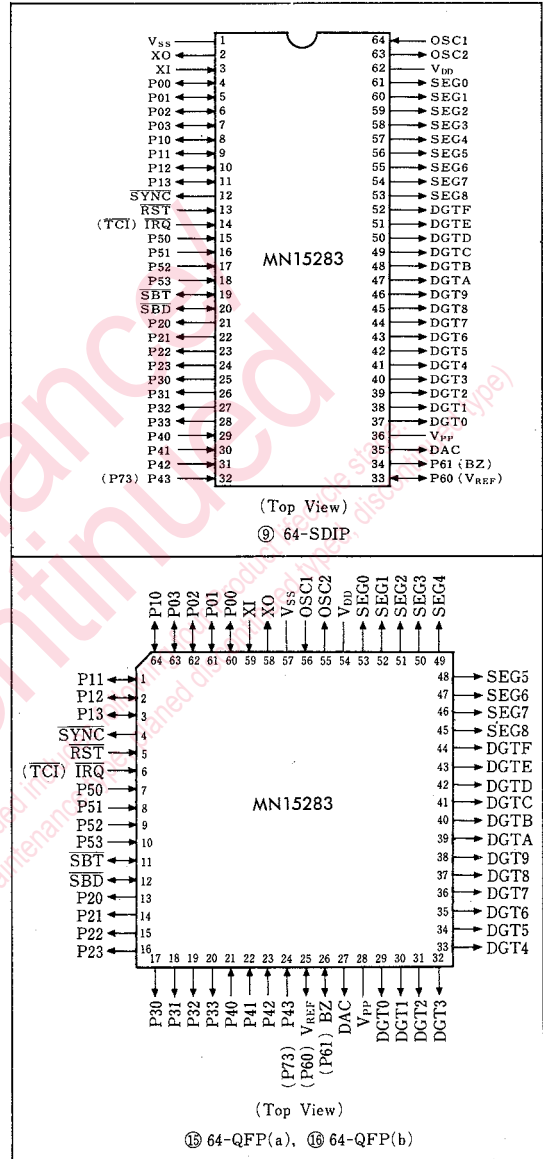


MN15283

■ Features

- ROM capacity: $8,192 \times 8$ bits
- RAM capacity: 512×4 bits
- Machine cycle: $1.91 \mu\text{s}$ (4.0 to 5.5 V)
 $6.15 \mu\text{s}$ (3.0 to 5.5 V)
- Interrupt: External interrupt 1
Timer interrupt 1
Serial interrupt 1
Watch/digit interrupt 1
Time base interrupt 1
- Timer/counter: Timer and event count functions provided by 8-bit programmable timer with 7-bit prescaler
- Serial interface: 8-bit synchronous type
- Fluorescent display tube direct drive pins: 16 for digit output, 9 for segment output
- Channel selecting function: 14-bit PWM system D/A converter
- Buzzer driver circuit incorporated: 2 kHz
- Pulse width measuring circuit incorporated: Pulse width measurable
- High impedance control: Port high impedance controllable
- System clock selector circuit incorporated: Programmable selection of system clock sources enabled. Clock sources are OSC1, OSC2 or XI, XO.
- Backup mode: STOP/HALT mode
- Operating voltage range: 3.0 to 5.5 V
- I/O pins: 8 for general purpose I/O
10 for general purpose output
8 for general purpose input
1 for serial data I/O
1 for serial clock I/O
1 for buzzer output
1 for analog input
1 for V_{REF} input
1 for PWM output
9 for fluorescent display tube segment output

■ Pin Configuration



16 for fluorescent display tube digit output
5 for LED driver output

- Process: Silicon gate CMOS
- Package: 64-QFP/SDIP
- Piggyback: EP15283

■ Pin Descriptions

Pin No.		Symbol	Pin Name	I/O	Description
64-SDIP	64-QFP				
62 1	54 57	V _{DD} V _{SS}	Power supply	I	Connect +3.0-5.5 V to V _{DD} , and 0 V to V _{SS} .
64 63	56 55	OSC1 OSC2	Clock input Clock output	I O	Oscillation terminals to connect f _{osc} ceramic oscillator or crystal oscillator. A feedback resistor is incorporated between OSC1 and OSC2.
3 2	59 58	XI XO	Clock input Clock output	I O	Event counter clock source terminals to connect a crystal oscillator. A feedback resistor between XI and XO can be selected with a mask option. They serve as an operating clock source when XI/XO is specified by clock selection.
13	5	RST	Reset input	I	Reset is applied if the "L" level is inputted over 0.3μs. A pull-up resistor can be specified with a mask option.
12	4	SYNC	SYNC. signal output	O	An internal timing signal is outputted every machine cycle at reset time.
14	6	IRQ (TCI)	External interrupt/pulse input	I	When used as an external interrupt, it receives an interrupt at a negative edge. A time base interrupt results in case of internal interrupt. TCI/IRQ can be selected through an internal port.
19	11	SBT	Serial interface clock I/O	I/O	Serial interface send/receive clock I/O terminal. It serves as an output terminal in the internal clock mode, and as an input terminal in the external clock mode. A pull-up resistor can be specified with a mask option.
20	12	SBD	Serial interface data I/O	I/O	Serial interface send/receive data I/O terminal. It inputs 8-bit serial data in the receive mode, and outputs 8-bit serial data in the send mode. An output type is either push-pull or N-channel open drain which can be selected with a mask option.
35	27	DAC	D/A converter output	O	14-bit D/A converter output terminal(PWM system). An output type is either push-pull or N-channel which can be selected with a mask option.
4~11	60~64 1~3	P00~P13	Parallel data I/O	I/O	4-bit parallel data I/O ports. Output, I/O or input can be selected with a mask option. A pull-up resistor can be specified with a mask option.
21~28	13~20	P20~P33	Parallel data output	O	4-bit parallel data output ports.
29~32 15~18	21~24 7~10	P40~P53	Parallel data input	I	4-bit parallel data input ports. A pull-up resistor can be specified with a mask option. P50-53 can be also specified for TTL level input with a mask option. P43 and P73 are commonly used.
32	24	P73	Analog input	I	Input terminal to compare with V _{REF} . P43 and P73 are commonly used.
33 34	25 26	P60(V _{REF}) ~P61 (BZ)	Parallel data output terminal/ input	O /I	2-bit parallel data output ports. P60 is the N-channel open drain output(LED directly drivable) and commonly used for V _{REF} . P61 can be specified for buzzer output with a mask option.
37~52	29~44	DGT0 ~DGTF	Fluorescent display tube digit output	O	High-voltage output terminal to be connected to a fluorescent display tube digit input terminal. Duty can be selected with a mask option. DGT0-4 can be specified for LED drivers with a mask option.

■ Pin Descriptions(Continued)

Pin No.		Symbol	Pin Name	I/O	Description
64-SDIP	64-QFP				
53~61	45~53	SEG0~ SEG8	Fluorescent display tube segment output	O	High-voltage output terminal to be connected to a fluorescent display tube segment input terminal.
36	28	V _{PP}	High - voltage power	I	High-voltage output transistor loading power supply. Normally, V _{PP} = -30 V.

Maintenance/Discontinued

Maintenance/Discontinued includes following four Product lifecycle stage.
(planned maintenance type, maintenance type, planned discontinued type, discontinued type)

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. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation 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 our company.