

# MN63121

## 1K-Bit EEPROM

### ■ Overview

The MN63121 is a 1K-bit EEPROM supporting serial I/O and operating on a single power supply with a voltage between 1.8 and 5.5 V. It provides the following pins for easy interfacing to microprocessors or microcontrollers: chip select ( $\overline{CS}$ ), serial clock ( $\overline{SCK}$ ), data input (DI), data output (DO), reset (RESET), and busy (RDY/ $\overline{BUSY}$ ). It includes a built-in timer for use in automatically erasing and writing data during data update operations.

The memory organization is  $64 \times 16$  bits. The chip indicates the end of a write operation with either the RDY/ $\overline{BUSY}$  pin or the state of the DO pin after the status output mode has been set.

Conversion of peripheral circuits to CMOS realizes great reductions in power consumption. Use of floating gate memory cells and a built-in error correction circuit ensures reliable operation for  $10^5$  write cycles.

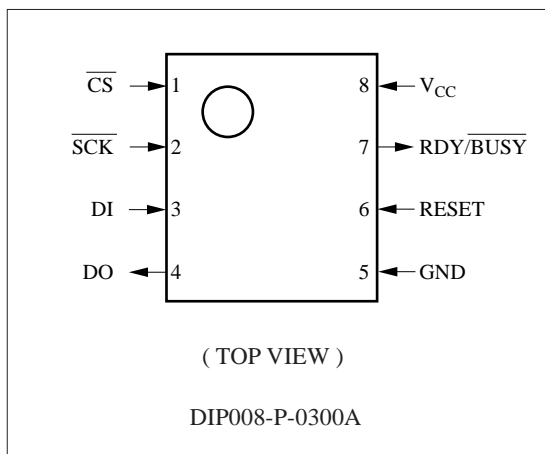
### ■ Features

- Memory organization:  $64 \times 16$  bits
- Floating gate memory cells
- Function blocking erroneous writes
- Low power consumption
  - Reads: max. 6.6 mW for  $V_{CC} = 3.3$  V
  - Standby: max. 66  $\mu$ W for  $V_{CC} = 3.3$  V
- Built-in self-timer for use in automatically erasing and writing
- Built-in error correction circuit that guarantees  $10^5$  write cycles
- 10-year data preservation period

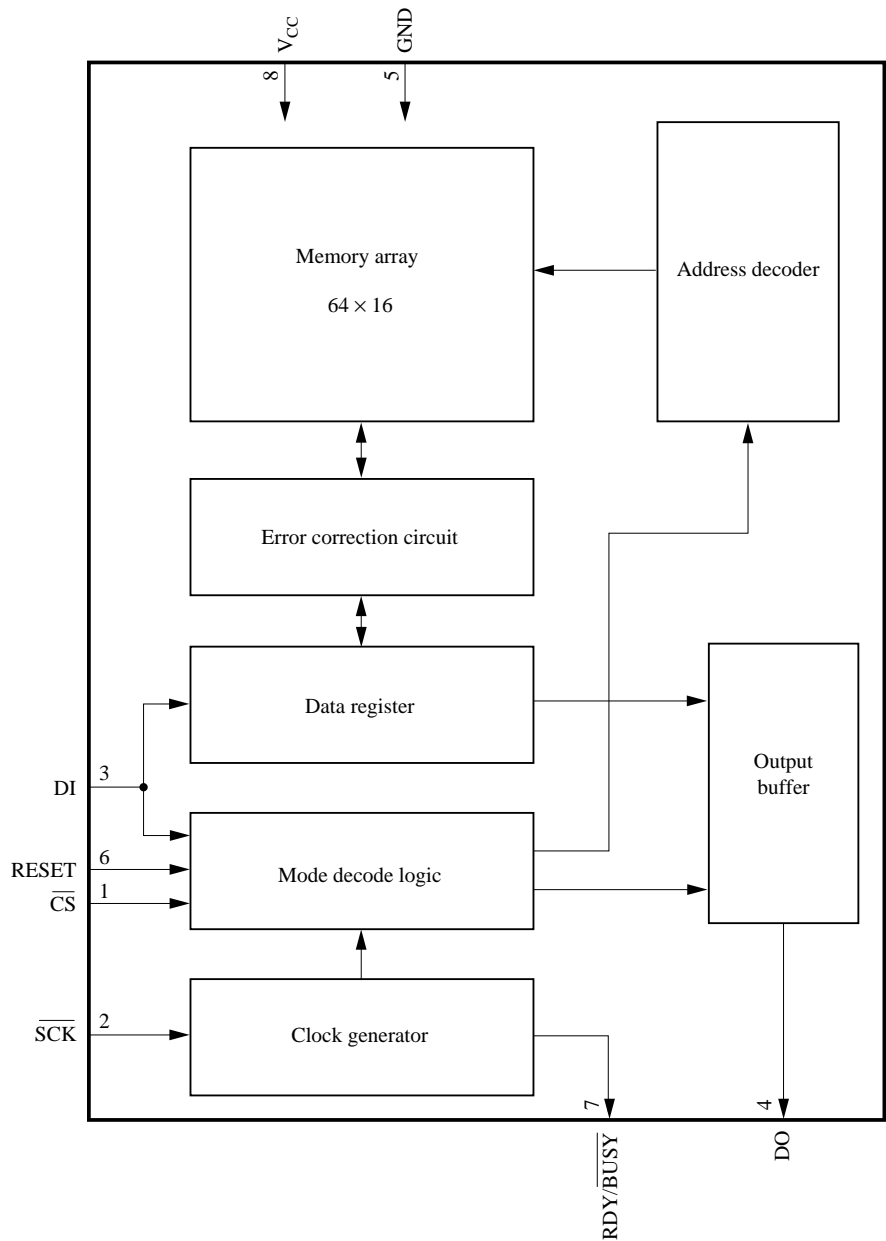
### ■ Applications

- Keyless entry systems, cordless telephones, storage for recognition and adjustment data for terminals, etc.

### ■ Pin Assignment



■ Block Diagram



## ■ Pin Descriptions

| Pin No. | Symbol                  | Pin Name           |
|---------|-------------------------|--------------------|
| 1       | $\overline{\text{CS}}$  | Chip select input  |
| 2       | $\overline{\text{SCK}}$ | Serial clock input |
| 3       | DI                      | Data input         |
| 4       | DO                      | Data output        |
| 6       | RESET                   | Reset input        |
| 7       | RDY/BUSY                | Busy output        |

## ■ Electrical Characteristics

$V_{CC}=1.8$  to  $5.5\text{V}$ ,  $T_a=-10^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$

| Parameter   | Symbol    | Test Conditions  | 2 to 3 V Operation  |                     | 5 V Operation |                | Unit          |
|---|-----------|--|---------------------|---------------------|---------------|----------------|---------------|
|   |           |  | min                 | max                 | min           | max            |               |
| Power supply voltage                                | $V_{CC}$  |  | 1.8                 | 3.3                 | 4.5           | 5.5            | V             |
| Input leakage current at "L" level                  | $I_{LIL}$ |  | -10                 | 10                  | -10           | 10             | $\mu\text{A}$ |
| Input leakage current at "H" level                  | $I_{LIH}$ |  | -10                 | 10                  | -10           | 10             | $\mu\text{A}$ |
| Output leakage current                              | $I_{LO}$  |  | —                   | 10                  | —             | 10             | $\mu\text{A}$ |
| Input voltage at "L" level                          | $V_{IL}$  |  | -0.1                | $0.2 \times V_{CC}$ | -0.1          | 0.7            | V             |
| Input voltage at "H" level                          | $V_{IH}$  |  | $0.8 \times V_{CC}$ | $V_{CC} + 0.3$      | 3.0           | $V_{CC} + 0.3$ | V             |
| $V_{CC}$ power supply current<br>(during operation) | $I_{CC}$  | $\overline{\text{SCK}}=250\text{kHz}$  | —                   | 2.0                 | —             | —              | mA            |
|   |           | $\overline{\text{SCK}}=1\text{MHz}$  | —                   | —                   | —             | 3.0            |               |
| $V_{CC}$ power supply current<br>(during standby)   | $I_{SB}$  | $\overline{\text{CS}}$ , $\overline{\text{SCK}}$ , DI,<br>RESET="H"<br>Other pins open | —                   | 20                  | —             | 30             | $\mu\text{A}$ |
| Output voltage for "L" level<br>(during reads)      | $V_{OL}$  | $I_{OL}=400\text{ }\mu\text{A}$  | —                   | 0.3                 | —             | —              | V             |
|   |           | $I_{OL}=2.1\text{mA}$  | —                   | —                   | —             | 0.45           |               |
| Output voltage for "H" level<br>(during reads)      | $V_{OH}$  | $I_{OH}=-10\text{ }\mu\text{A}$  | $V_{CC} - 0.3$      | —                   | —             | —              | V             |
|   |           | $I_{OH}=-400\text{ }\mu\text{A}$   | —                   | —                   | 2.4           | —              |               |

## ■ Function Descriptions

| Orders | Code     | Address                | Data                               | Function  |
|--------|----------|------------------------|------------------------------------|---|
| READ   | 10101000 | $A_0A_1A_2A_3A_4A_500$ | $D_0-D_7D_8-D_{15}$                | Read from address indicated with pins $A_0-A_5$ |
| WRITE  | 10100100 | $A_0A_1A_2A_3A_4A_500$ | $D_0-D_7D_8-D_{15}$                | Write to address indicated with pins $A_0-A_5$  |
| EWEN   | 10100011 | xxxxxxx                | —                                  | Enable erase/write                              |
| EWDS   | 10100000 | xxxxxxx                | —                                  | Disable erase/write                             |
| BUSYFG | 10101001 | 00xxxxxx               | 0(busy)<br>1(ready)                | Status output busy flag                         |
| ENFG   |          | 10xxxxxx               | 0(enable)<br>1(disable)            | Status output write enable flag                 |
| ECCFG  |          | 01xxxxxx               | 0(non-correction)<br>1(correction) | Status output ECC flag                          |

Note: x means "don't care".

## ■ Package Dimensions (Unit:mm)

DIP008-P-0300A

