**Panasonic**

# MN63154

## EEPROM for IC Cards

### ■ Overview

The MN63154 is an EEPROM for use in IC cards. It features security features and an address specification system using opcode input.

Low cost combined with high security makes the chips ideal for use in prepaid cards and other types of IC cards.

### ■ Features

● Easy-to-use control system
  • Address specification system using opcode input over a 3-wire interface (CLK, I/O, and RST)
  • Automatic erasing and writing using a single 5 volt power supply

● Flexible memory-layout

   The memory is divided into 11 areas. Six areas containing 500 bytes are freely usable.

● Advanced security features

  • Verification of IC card authenticity

   The IC passes entered data through a random number generator circuit on its way to output to provide a check of card validity.

  • Protection against malicious experimentation

   Four or more unsuccessful attempts to access the IC card render it permanently unusable.

  • Protection of individual memory areas on the card

   Read or write access to a memory area requires matches for both security and condition codes. There is also a condition code for permanently disabling re-write.

  • Mixed configuration of EPROM and EEPROM

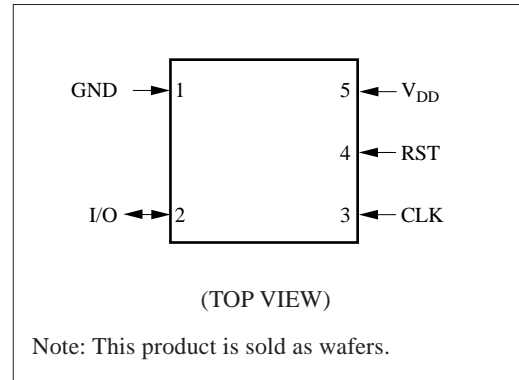   Individual areas consist of EPROM or EEPROM.

● High reliability
  • Write cycles: 10,000 times
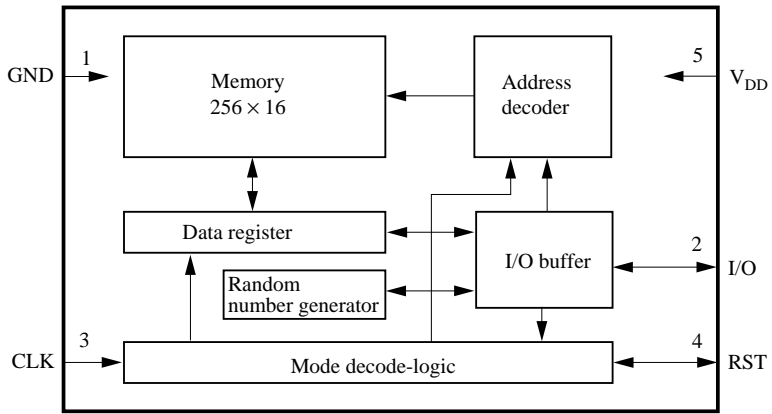  • Data storage interval: 10 years

### ■ Applications

● IC cards

### ■ Pad Assignment



(TOP VIEW)

Note: This product is sold as wafers.

■ Block Diagram

## ■ Pin Descriptions

| Pin No. | Symbol | Pin Name | I/O |
|---------|--------|----------|-----|
| 1 | GND | Ground | I |
| 2 | I/O | Data I/O | I/O |
| 3 | CLK | Clock | I |
| 4 | RST | Reset | I |
| 5 | $V_{DD}$ | Power supply | I |

## ■ Electrical Characteristics

$V_{CC}$=4.5 to 5.5V, Ta=−10˚C to +70˚C

| Parameter | Symbol | Test Conditions | min | max | Unit |
|-----------|--------|-----------------|-----|-----|------|
| Power supply voltage | $V_{CC}$ | | 4.5 | 5.5 | V |
| "L" level input leakage current | $I_{LIL}$ | | −10 | 10 | µA |
| "H" level input leakage current | $I_{LIH}$ | | −10 | 10 | µA |
| $V_{CC}$ power supply current (during operation) | $I_{CC}$ | $V_{CC}$=5.5V CLK=800kHz | — | 5.45 | mA |
| $V_{CC}$ power supply current (during standby) | $I_{SB}$ | CLK="L" I/O="H" | — | 0.18 | mA |

Notes

1: I/O pins use N-channel, open drain configuration.

2: Input voltages, output voltages, and other items not listed above conform to ISO/IEC 7816-3.
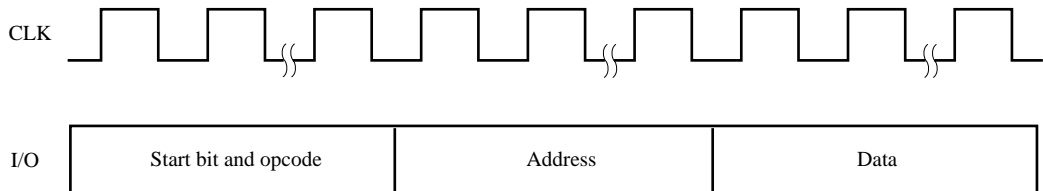
## ■ Function Descriptions

| Orders | Start bit | Operation code | Address | Data | Contents |
|--------|-----------|----------------|---------|------|----------|
| READ | 0 | 10 | $A_8$, $A_7$ to $A_0$ | $D_0$, $D_1$ to $D_{31}$ | Read |
| WRITE | 0 | 01 | $A_8$, $A_7$ to $A_0$ | $D_0$, $D_1$ to $D_{15}$ | Write |
| VERIFY | 0 | 11 | 000001010 | $D_0$, $D_1$ to $D_{31}$ | Verify code |
| RNGEN | 0 | 00 | 000001010 | $D_0$, $D_1$ to $D_{31}$ $D_{O0}$, $D_{O1}$ to $D_{O31}$ | Verify code, generate random number |
| RESET | 0 | 11 | 111111111 | — | Reset |
| EWEN | 0 | 00 | 1xxxxxxxx | — | Enable write |

Note: x means "don't care".

■ Memory Layout

| Area | Contents | Number of Bits | Memory Type |
|------|----------|----------------|-------------|
| A | Chip manufacturer's code | 16 | EPROM |
| B | Card manufacturer's code | 16 | EPROM |
| C | Spare area 1 | 32 | EPROM |
| D | Spare area 2 | 16 | EEPROM |
| E | Spare area 3 | 48 | EPROM |
| F | Spare area 4 | 16 | EEPROM |
| G | Security code | 32 | EEPROM |
| H | Error counter | 16 | EEPROM |
| I1 | Condition code 1 | 8 | EPROM |
| I2 | Condition code 2 | 8 | EEPROM |
| J | Application area 1 | 1952 | EEPROM |
| K | Application area 2 | 1936 | EEPROM |

■ Timing Chart



| Start bit and opcode | Address | Data |
|----------------------|---------|------|

Note: This product is sold as wafers.