

By using the CMOS Silicon-gate process and the floating gate memory cell, this series of devices realize high reliability. The product line-up follows:

### ■ FEATURES

- Low current consumption
- Wide operating voltage
- Write operation with a built-in timer
- Erase data mode and write all mode
- Data retention : 10 years
- Endurance : 10<sup>5</sup> cycles/word  
1K-bit to 32K-bit : 10<sup>6</sup> cycles/word also available.
- Operating temperature : -40°C to 85°C

### ■ APPLICATIONS

- Pager security (ID code)
- Camera
- Cordless telephone set
- VTR
- Printer

### ■ SPECIFICATIONS

| Memory size | Model No. | Composition       | Instruction code conforming to: | Functions                    |                      |              |                             | Package                     | Pin config No. | Operating voltage |             | Current consumption                    |               | Clock frequency Max.                         |
|-------------|-----------|-------------------|---------------------------------|------------------------------|----------------------|--------------|-----------------------------|-----------------------------|----------------|-------------------|-------------|----------------------------------------|---------------|----------------------------------------------|
|             |           |                   |                                 | Continuous read operation *1 | Memory protection *2 | CS Active *3 | Micro computer interface *4 |                             |                | Read              | Write       | Read Max.                              | Stand by Max. |                                              |
| 512 bit     | S-2900A   | 64 x 8            | SII original                    |                              |                      | H            | ○                           | 8DIP/SOP<br>SOT-89-5<br>Die | 1              | 1.5 to 5.5V       | 2.7 to 5.5V | 1.4mA(5.5V)<br>0.4mA(1.5V)             | 1.0 μA        | 2.0MHz                                       |
| 1K bit      | S-93C46A  | 64 x 16           | NM93CS46                        | ○                            |                      | H            |                             | 8DIP/SOP<br>8TSSOP<br>8MSOP | 2              | 1.8 to 5.5V       | 1.8 to 5.5V |                                        | 1.0 μA        | 0.25MHz(1.8V)<br>to 2.0MHz(5.5V)             |
|             | S-29130A  | 64 x 16           | NM93CS46                        | ○                            |                      | H            |                             | 8DIP/SOP                    | 3              |                   |             |                                        |               |                                              |
|             | S-29131A  | 32 x 16 + 32 x 16 | NM93CS46                        | ○                            | ○                    | H            |                             | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
|             | S-29190A  | 64 x 16           | SII original                    | ○                            |                      | H            | ○                           | 8DIP/SOP                    | 4              | 1.8 to 6.5V       | 2.5 to 6.5V |                                        | 1.0 μA        | 2.0MHz                                       |
|             | S-29191A  | 32 x 16 + 32 x 16 | SII original                    | ○                            | ○                    | H            | ○                           | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
|             | S-29194A  | 32 x 16 + 32 x 16 | SII original                    | ○                            | ○                    | L            | ○                           | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
| 2K bit      | S-93C56A  | 128 x 16          | NM93CS56                        | ○                            |                      | H            |                             | 8DIP/SOP<br>8TSSOP<br>8MSOP | 2              | 1.8 to 5.5V       | 1.8 to 5.5V | 0.8 mA<br>(5.5 V)<br>0.4 mA<br>(2.5 V) | 1.0 μA        | 0.25MHz(1.8V)<br>to 2.0MHz(5.5V)             |
|             | S-29220A  | 128 x 16          | NM93CS56                        | ○                            |                      | H            |                             | 8DIP/SOP                    | 3              |                   |             |                                        |               |                                              |
|             | S-29221A  | 64 x 16 + 64 x 16 | NM93CS56                        | ○                            | ○                    | H            |                             | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
|             | S-29231A  | 64 x 16 + 64 x 16 | CAT33C102                       | ○                            | ○                    | H            |                             | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
|             | S-29230A  | 128 x 16          | CAT35C102                       | ○                            |                      | H            |                             | 8DIP/SOP                    | 4              | 1.8 to 6.5V       | 2.5 to 6.5V |                                        | 1.0 μA        | 2.0MHz                                       |
|             | S-29290A  | 128 x 16          | SII original                    | ○                            |                      | H            | ○                           | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
|             | S-29291A  | 64 x 16 + 64 x 16 | SII original                    | ○                            | ○                    | H            | ○                           | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
|             | S-29294A  | 64 x 16 + 64 x 16 | SII original                    | ○                            | ○                    | L            | ○                           | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
| 4K bit      | S-29255A  | 128 x 16          | M6M80021                        |                              | △                    | L            | ○                           | 8DIP/SOP                    | 5              | 1.8 to 6.5V       | 2.7 to 6.5V | 2.0mA                                  |               |                                              |
|             | S-93C66A  | 256 x 16          | NM93CS66                        | ○                            |                      | H            |                             | 8DIP/SOP<br>8TSSOP<br>8MSOP | 2              | 1.8 to 5.5V       | 1.8 to 5.5V |                                        | 1.0 μA        | 0.25MHz(1.8V)<br>to 2.0MHz(5.5V)             |
|             | S-29331A  | 128x16+128x16     | NM93CS66                        | ○                            | ○                    | H            |                             | 8DIP/SOP                    | 4              |                   |             | 0.8 mA<br>(5.5 V)<br>0.4 mA<br>(2.5 V) |               |                                              |
|             | S-29330A  | 256 x 16          | NM93CS66                        | ○                            |                      | H            |                             | 8DIP/SOP                    | 3              |                   |             |                                        |               |                                              |
|             | S-29390A  | 256 x 16          | SII original                    | ○                            |                      | H            | ○                           | 8DIP/SOP                    | 4              | 1.8 to 6.5V       | 2.5 to 6.5V |                                        | 1.0 μA        | 2.0MHz                                       |
|             | S-29391A  | 128x16+128x16     | SII original                    | ○                            | ○                    | H            | ○                           | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
| 8K bit      | S-29394A  | 128x16+128x16     | SII original                    | ○                            | ○                    | L            | ○                           | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
|             | S-29355A  | 256 x 16          | M6M80041                        |                              | △                    | L            | ○                           | 8DIP/SOP                    | 5              | 1.8 to 6.5V       | 2.7 to 6.5V | 2.0mA                                  |               |                                              |
| 16K bit     | S-29430A  | 512 x 16          | NM93CXX                         | ○                            |                      | H            |                             | 8DIP/SOP                    | 6              | 1.8 to 5.5V       | 2.5 to 5.5V | 1.2 mA<br>(5.5 V)<br>0.4 mA<br>(2.5 V) |               |                                              |
|             | S-29453A  | 512 x 16          | M6M800X1                        | ○                            |                      | L            | ○                           | 8DIP/SOP                    | 4              |                   |             |                                        |               |                                              |
| 32K bit     | S-29630A  | 1024x16           | NM93C86A                        | ○                            |                      | H            |                             | 8DIP/SOP<br>Die             | 6              | 1.8 to 5.5V       | 1.8 to 5.5V |                                        |               |                                              |
|             | S-29690A  | 2048x16           | SII original                    | ○                            |                      | H            | ○                           |                             |                |                   |             |                                        | 1.0 μA        | 0.20 MHz<br>(1.8 V)<br>to 1.4 MHz<br>(5.5 V) |

\* 1 In continuous read operation address is incremented sequentially every 16th bit.

\* 2 50% memory protection from the first address.

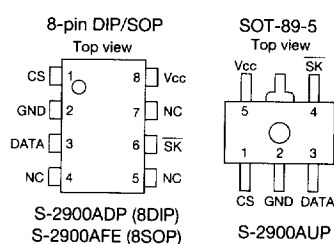
\* 3 CS : chip select

\* 4 8-bit composition instruction enables easy interface with serial port.

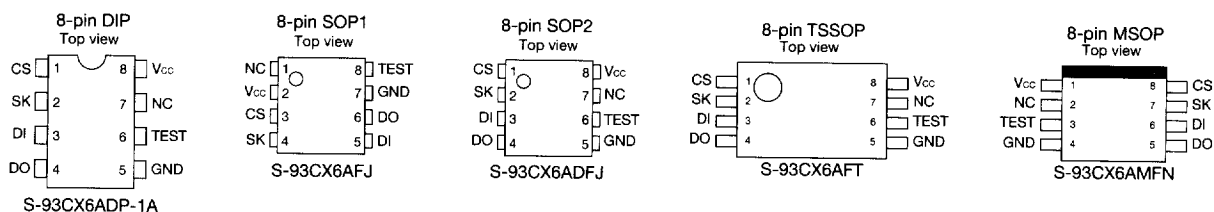
△: Memory protection by RESET pin

## PIN CONFIGURATIONS

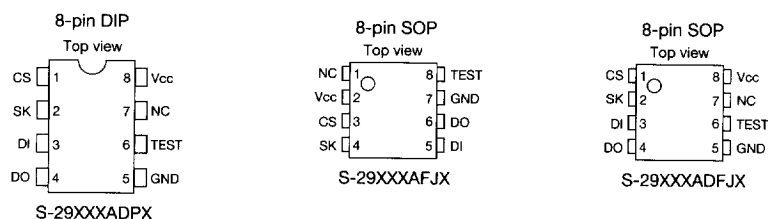
1.



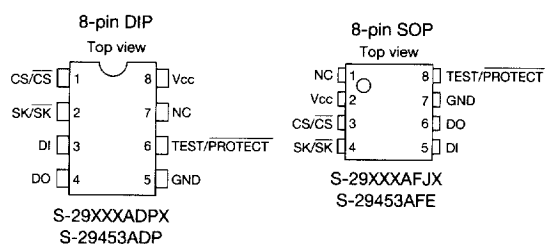
2.



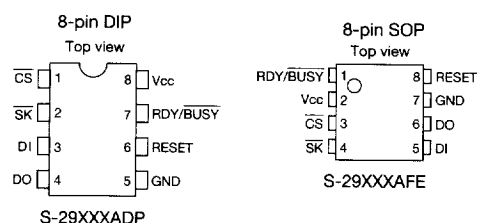
3.



4.



5.



6.

