

54S/74S89
54LS/74LS89 (Preliminary data)

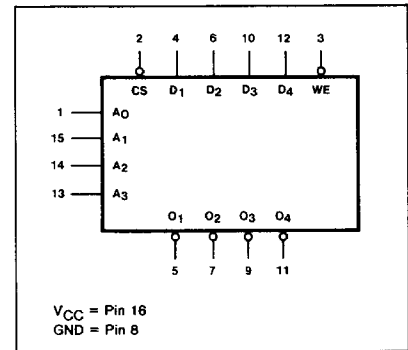
DESCRIPTION

The "89" is a 64-Bit high-speed Read / Write Random Access Memory for use as a "scratch pad" memory with non-destructive read-out. Memory cells are organized in a matrix to provide 16 words of four bits each. Four buffered Address (A_0 - A_3) inputs are decoded on the chip to select one of the sixteen memory words for read or write operations. Four buffered Data inputs (D_1 - D_4) and four open-collector data outputs are provided for versatile memory expansion. Data at the outputs is inverted from the data which was written into the memory. When the write mode is selected the outputs are the complement of the data inputs.

FEATURES

- 16-words by 4-bit memory
- On-chip address decoding
- Inverted data at outputs
- Open collector outputs for easy expansion

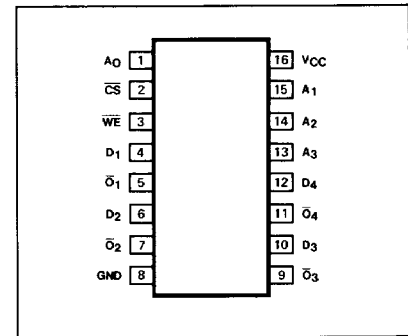
LOGIC SYMBOL



ORDERING CODE (See Section 9 for further Package and Ordering Information)

| PACKAGES | COMMERCIAL RANGES $V_{CC}=5V \pm 5\%$; $T_A=0^\circ C$ to $+70^\circ C$ | | MILITARY RANGES $V_{CC}=5V \pm 10\%$; $T_A=-55^\circ C$ to $+125^\circ C$ | |
|-------------|---|---------|---|--------------------|
| | Plastic DIP | N74S89N | • | N74LS89N |
| Ceramic DIP | N74S89F | • | N74LS89F | S54S89F • S54LS89F |
| Flatpak | | | | |

PIN CONFIGURATION



INPUT AND OUTPUT LOADING AND FAN-OUT TABLE^(a)

| PINS | DESCRIPTION | | 54/74 | 54S/74S | 54LS/74LS |
|-------------------------------------|---------------------------------------|--|-------|--|---------------------------------|
| A_0 - A_3 | Address inputs | I_{IH} (μA) I_{IL} (μA) | | 25 / 10 ^(a) -150 / -100 ^(a) | 20 -100 |
| \overline{CS} | Chip Select (active LOW) enable input | I_{IH} (μA) I_{IL} (μA) | | 25 / 10 ^(a) -150 / -100 ^(a) | 20 -400 |
| \overline{WE} | Write Enable (active LOW) input | I_{IH} (μA) I_{IL} (μA) | | 25 / 10 ^(a) -150 / -100 ^(a) | 20 -400 |
| D_1 - D_4 | Data inputs | I_{IH} (μA) I_{IL} (μA) | | 25 / 10 ^(a) -150 / -100 ^(a) | 20 -400 |
| \overline{O}_1 - \overline{O}_4 | Data (inverting) outputs | I_{OH} (μA) I_{OL} (mA) | | + 100 16 | + 100 12 / 24 ^(a) |

NOTE

a. The slashed numbers indicate different parametric values for Military/Commercial temperature ranges respectively.

FUNCTIONAL DESCRIPTION

The "89" is a high-speed array of 64 memory cells organized as 16 words of four bits each. A one-of-sixteen address decoder selects a single word which is specified by the four Address inputs (A_0 - A_3). A READ operation is initiated after the address lines are stable when the Write Enable (\overline{WE}) input is HIGH and the Chip Select-Memory Enable (\overline{CS}) input is LOW. Data is read at the outputs inverted from the data which was written into the memory.

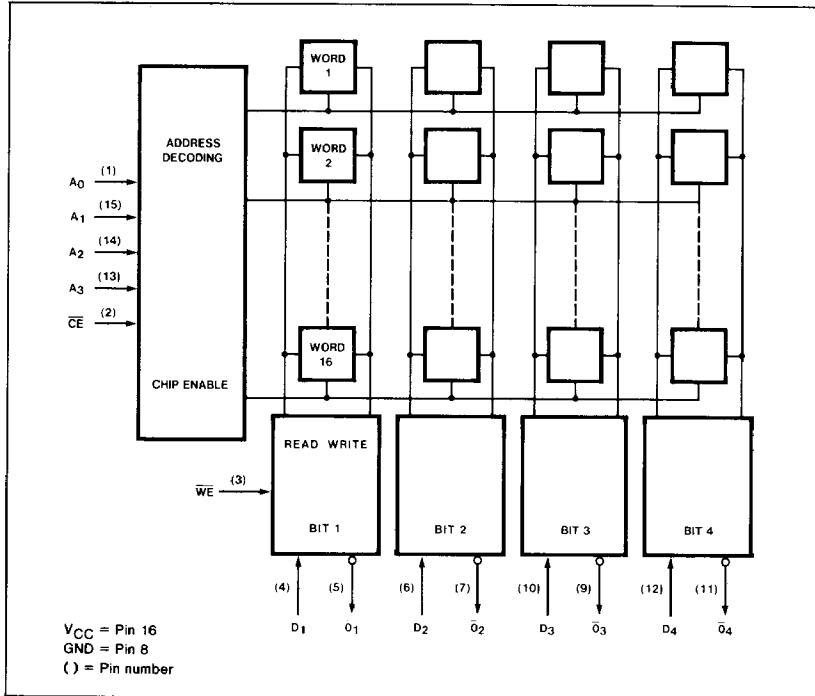
A WRITE operation requires that the \overline{WE} and \overline{CS} inputs be LOW. The address inputs must be stable during the WRITE mode for predictable operation. When the write mode is selected the outputs are the complement of the data inputs. The selected memory cells are transparent to changes in the data during the WRITE mode. Therefore, data must be stable one setup time before the LOW-to-HIGH transition of \overline{CE} or \overline{WE} .

MODE SELECT—FUNCTION TABLE

| OPERATING MODE | INPUTS | | | OUTPUTS |
|-----------------------|-----------------|-----------------|-------|--------------------------|
| | \overline{CS} | \overline{WE} | D_n | \overline{O}_n |
| Write | L | L | L | H |
| | L | L | H | L |
| Read | L | H | X | $\overline{\text{Data}}$ |
| Inhibit Writing | H | L | L | H |
| | H | L | H | L |
| Store-Disable Outputs | H | H | X | H |

H = HIGH voltage level
 L = LOW voltage level
 X = Don't care
 Data = Read complement of data from addressed word location

BLOCK DIAGRAM



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE^(b)

| PARAMETER | TEST CONDITIONS | | 54/74 | | 54S/74S | | 54LS/74LS | | UNIT |
|------------------------------------|--|------------------------|-------|-----|---------|------|-----------|--------------------|------|
| | | | Min | Max | Min | Max | Min | Max | |
| V _{OL} Output LOW voltage | V _{CC} = Min, I _{OL} = 16mA | Mil | | | | 0.5 | | | V |
| | | Com | | | | 0.45 | | | V |
| | V _{CC} = Min | I _{OL} = 12mA | | | | | | 0.4 | V |
| | | I _{OL} = 24mA | | | | | | 0.5 ^(c) | V |
| I _{CC} Supply Current | V _{CC} = Max | Mil | | | | 120 | | 45 | mA |
| | | Com | | | | 105 | | 37 | mA |

See BIPOLAR & MOS MEMORY DATA MANUAL for 54S/74S89 AC Characteristics

NOTES

- b. For family dc characteristics, see inside front cover for 54/74 and 54H/74H, and see inside back cover for 54S/74S and 54LS/74LS specifications
 c. This parameter for Commercial Range only.