

✓ 54S/74S289 *011743*
 ✓ 54LS/74LS289 *011748*

64-BIT RANDOM ACCESS MEMORY
 (With Open-Collector Outputs)

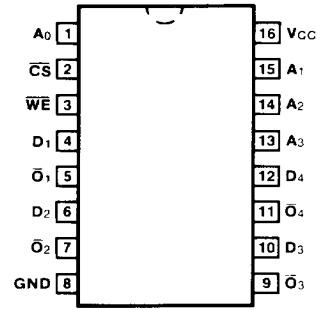
DESCRIPTION — The '289 is a high speed 64-bit RAM organized as a 16-word by 4-bit array. Address inputs are buffered to minimize loading, and addresses are fully decoded on-chip. Outputs are open-collector type and are in the off (HIGH) state whenever the Chip Select (CS) input is HIGH. The outputs are active only in the Read mode; output data is the complement of the stored data.

- OPEN-COLLECTOR OUTPUTS FOR WIRED-AND APPLICATIONS
- BUFFERED INPUTS MINIMIZE LOADING
- ADDRESS DECODING ON-CHIP
- DIODE CLAMPED INPUTS MINIMIZE RINGING

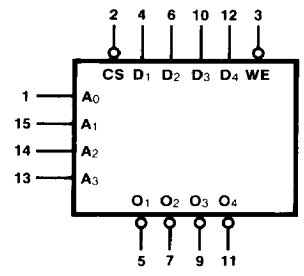
ORDERING CODE: See Section 9

| PKGS | PIN OUT | COMMERCIAL GRADE | MILITARY GRADE | PKG TYPE |
|-----------------|---------|--|--|----------|
| | | V _{CC} = +5.0 V ±5%, T _A = 0°C to +70°C | V _{CC} = +5.0 V ±10%, T _A = -55°C to +125°C | |
| Plastic DIP (P) | A | 74S289PC, 74LS289PC | | 9B |
| Ceramic DIP (D) | A | 74S289DC, 74LS289DC | 54S289DM, 54LS289DM | 6B |
| Flatpak (F) | A | 74S289FC, 74LS289FC | 54S289FM, 54LS289FM | 4L |

CONNECTION DIAGRAM
 PINOUT A



LOGIC SYMBOL



V_{CC} = Pin 16
 GND = Pin 8

INPUT LOADING/FAN-OUT: See Section 3 for U.L. definitions

| PIN NAMES | DESCRIPTION | 54/74S (U.L.) HIGH/LOW | 54/74LS (U.L.) HIGH/LOW |
|---------------------------------|---------------------------------|------------------------|-------------------------|
| A ₀ — A ₃ | Address Inputs | 0.63/0.16 | 0.5/0.013 |
| CS | Chip Select Input (Active LOW) | 0.63/0.16 | 0.5/0.013 |
| WE | Write Enable Input (Active LOW) | 0.63/0.16 | 0.5/0.013 |
| D ₁ — D ₄ | Data Inputs | 0.63/0.16 | 0.5/0.013 |
| O ₁ — O ₄ | Inverted Data Outputs | OC*/10 | OC*/10 (5.0) |

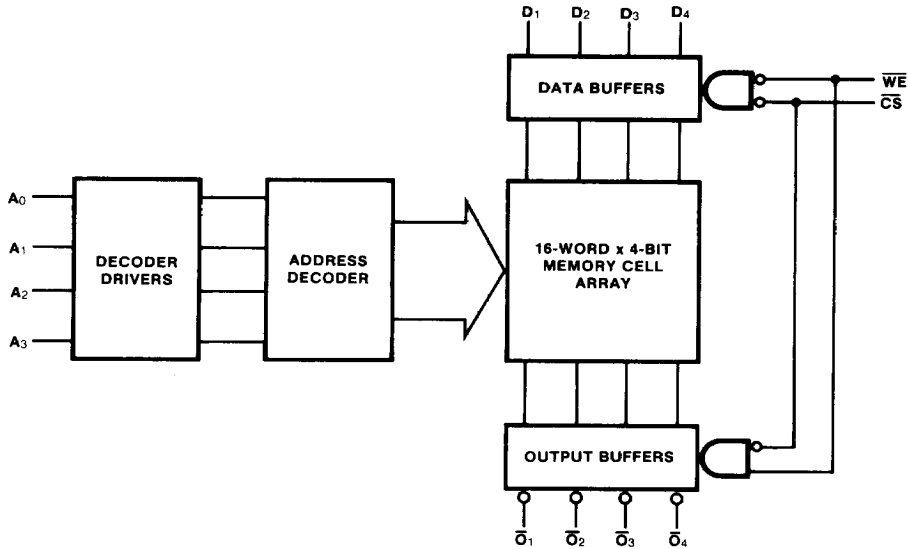
*OC — Open Collector

FUNCTION TABLE

| INPUTS | | OPERATION | CONDITION OF OUTPUTS |
|--------|----|-----------|---------------------------|
| CS | WE | | |
| L | L | Write | Off (HIGH) |
| L | H | Read | Complement of Stored Data |
| H | X | Inhibit | Off (HIGH) |

H = HIGH Voltage Level
 L = LOW Voltage Level
 X = Immaterial

LOGIC DIAGRAM



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

| SYMBOL | PARAMETER | | 54/74S | | 54/74LS | | UNITS | CONDITIONS | |
|--------|----------------------|----|--------|-----|---------|-----|---------------|---|-----------------------|
| | | | Min | Max | Min | Max | | | |
| VOL | Output LOW Voltage | XM | 0.5 | | 0.4 | | V | $V_{CC} = \text{Min}$ $I_{OL} = 16 \text{ mA (S289)}$ $I_{OL} = 8.0 \text{ mA (54LS289)}$ $I_{OL} = 16 \text{ mA (74LS289)}$ | |
| | | XC | 0.45 | | 0.5 | | | | |
| IOH | Output HIGH Current | | 40 | 100 | 20 | 100 | μA | $V_{OH} = 2.4 \text{ V}$ $V_{OH} = 5.5 \text{ V}$ | $V_{CC} = \text{Min}$ |
| ICC | Power Supply Current | | 105 | | 40 | | mA | $V_{CC} = \text{Max}$ | |

AC CHARACTERISTICS OVER RECOMMENDED V_{CC} AND T_A RANGE (unless otherwise specified)

| SYMBOL | PARAMETER | | 54/74S | | 54/74LS | | UNITS | CONDITIONS | |
|--------|---|----|-----------------------|-----|---------------------------|-----|-------|-----------------|--|
| | | | $C_L = 30 \text{ pF}$ | | $C_L = 15 \text{ pF}$ | | | | |
| | | | $R_L = *$ | | $R_L = 2 \text{ k}\Omega$ | | | | |
| | | | Min | Max | Min | Max | | | |
| tPLH | Access Time, HIGH or LOW, A_n to \overline{O}_n | XM | 50 | | 37** | | ns | Figs. 3-2, 3-20 | |
| tPHL | | XC | 35 | | 37** | | | | |
| tPHL | Access Time \overline{CS} to \overline{O}_n | XM | 25 | | 10** | | ns | Figs. 3-2, 3-5 | |
| | | XC | 17 | | 10** | | | | |
| tPLH | Disable Time \overline{CS} to \overline{O}_n | XM | 20 | | | | ns | | |
| | | XC | 17 | | | | | | |
| tPHL | Recovery Time \overline{WE} to \overline{O}_n | XM | 40 | | 30** | | ns | Figs. 3-2, 3-4 | |
| | | XC | 35 | | 30** | | | | |
| tPLH | Disable Time \overline{WE} to \overline{O}_n | XM | 30 | | | | ns | | |
| | | XC | 25 | | | | | | |

AC OPERATING REQUIREMENTS OVER RECOMMENDED V_{CC} AND T_A RANGE (unless otherwise specified)

| SYMBOL | PARAMETER | | 54/74S | | 54/74LS | | UNITS | CONDITIONS | |
|--------------------|---|--|--------|-----|---------|-----|-------|------------|--|
| | | | Min | Max | Min | Max | | | |
| t _s (H) | Setup Time, HIGH or LOW | | 0 | | 10** | | ns | Fig. 3-21 | |
| t _s (L) | A_n to \overline{WE} | | 0 | | 10** | | | | |
| t _h (H) | Hold Time, HIGH or LOW | | 0 | | 0** | | ns | | |
| t _h (L) | A_n to \overline{WE} | | 0 | | 0** | | | | |
| t _s (H) | Setup Time, HIGH or LOW | | 20 | | 25** | | ns | Fig. 3-13 | |
| t _s (L) | D_n to \overline{WE} | | 20 | | 25** | | | | |
| t _h (H) | Hold Time HIGH or LOW | | 0 | | 0* | | ns | | |
| t _h (L) | D_n to \overline{WE} | | 0 | | 0* | | | | |
| t _s (L) | Setup Time LOW \overline{CS} to \overline{WE} | | 0 | | | | ns | Fig. 3-14 | |
| t _h (L) | Hold Time LOW \overline{CS} to \overline{WE} | | 0 | | | | ns | Fig. 3-13 | |
| t _w (L) | \overline{WE} Pulse Width LOW | | 20 | | 25** | | ns | Fig. 3-14 | |

* $R_L = 300 \Omega$ to V_{CC} and 600Ω to Gnd.

**Typical Value