

# HM100415, HM100415CG

## 1024-word × 1-bit Fully Decoded Random Access Memory

The HM100415 is a 1024-word × 1-bit, read/write random access memory developed for application to scratch pads, control and buffer storages which require very high speeds.

The HM100415 is compatible with the HD100K families and includes on-chip voltage and temperature compensation for improved noise margin. This memory is encapsulated in cerdip-16pin package.

### ■ FEATURES

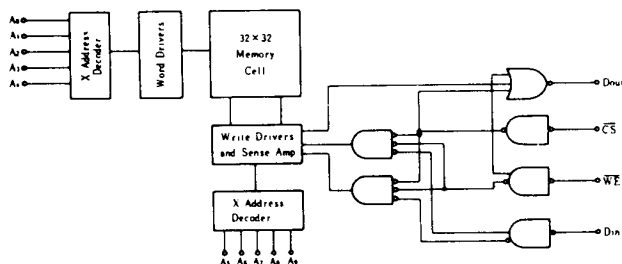
- Level ..... 100K ECL Compatible
- Organization ..... 1024-word by 1-bit
- Address Access Time ..... 10ns (max)
- Chip Select Access Time ..... 5ns (max.)
- Power Consumption ..... 0.6mW/bit (typ)
- Output Obtainable by Wired-OR (open emitter)
- Compatible with Fairchild F100415.

### ■ TRUTH TABLE

| Input |    |     | Output | Mode         |
|-------|----|-----|--------|--------------|
| CS    | WE | Din |        |              |
| H     | X  | X   | L      | Not Selected |
| L     | L  | L   | L      | Write "0"    |
| L     | L  | H   | L      | Write "1"    |
| L     | H  | X   | Dout*  | Read         |

Notes) X : Irrelevant  
\* : Read Out Noninvert

### ■ BLOCK DIAGRAM

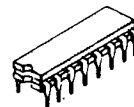


### ■ ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Item                | Symbol                             | Rating                  | Unit |
|---------------------|------------------------------------|-------------------------|------|
| Supply Voltage      | V <sub>EE</sub> to V <sub>CC</sub> | +0.5 to -7.0            | V    |
| Input Voltage       | V <sub>in</sub>                    | +0.5 to V <sub>EE</sub> | V    |
| Output Current      | I <sub>out</sub>                   | -30                     | mA   |
| Storage Temperature | T <sub>stg</sub>                   | -65 to +150             | °C   |
| Storage Temperature | T <sub>stg</sub> (Bias)*           | -55 to +125             | °C   |

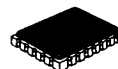
\* Under Bias

HM100415



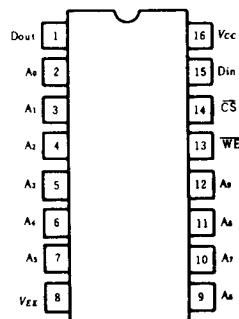
(DG-16A)

HM100415CG



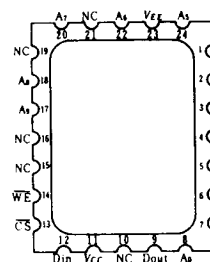
(CG-24)

### ■ PIN ARRANGEMENT ● HM100415



(Top View)

### ● HM100415CG



(Top View)



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## ■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS ( $V_{EE} = -4.5V$ ,  $R_L = 50\Omega$  to  $-2.0V$ ,  $T_a = 0$  to  $+85^\circ C$ , air flow exceeding 2m/sec)

| Item                     | Symbol    | Test Condition                  | min(B) | typ   | max(A) | Unit    |
|--------------------------|-----------|---------------------------------|--------|-------|--------|---------|
| Output Voltage           | $V_{OH}$  | $V_{iA} - V_{iNA}$ or $V_{iLB}$ | -1025  | -955  | -880   | mV      |
|                          | $V_{OL}$  |                                 | -1810  | -1715 | -1620  | mV      |
| Output Threshold Voltage | $V_{OHc}$ | $V_{iA} - V_{iNB}$ or $V_{iLA}$ | -1035  | —     | —      | mV      |
|                          | $V_{OLc}$ |                                 | —      | —     | -1610  | mV      |
| Input Voltage            | $V_{IH}$  | Guaranteed Input Voltage        | -1165  | —     | -880   | mV      |
|                          | $V_{iL}$  | High/Low for All Inputs         | -1810  | —     | -1475  | mV      |
| Input Current            | $I_{iH}$  | $V_{iA} - V_{iNA}$              | —      | —     | 220    | $\mu A$ |
|                          | $I_{iL}$  | $V_{iA} - V_{iLB}$              | CS     | 0.5   | —      | 170     |
|                          |           |                                 | Others | -50   | —      | —       |
| Supply Current           | $I_{EX}$  | All Inputs and Outputs Open     | -200   | -150  | —      | mA      |

● AC CHARACTERISTICS ( $V_{EE} = -4.5V \pm 5\%$ ,  $T_a = 0$  to  $+85^\circ C$ , air flow exceeding 2m/sec)

## 1. READ MODE

| Item                      | Symbol    | Test Condition | min | typ | max | Unit |
|---------------------------|-----------|----------------|-----|-----|-----|------|
| Chip Select Access Time   | $t_{ACS}$ |                | —   | 3   | 5   | ns   |
| Chip Select Recovery Time | $t_{ACS}$ |                | —   | 3   | 5   | ns   |
| Address Access Time       | $t_{AA}$  |                | —   | 7   | 10  | ns   |

## 2. WRITE MODE

| Item                   | Symbol     | Test Condition  | min | typ | max | Unit |
|------------------------|------------|-----------------|-----|-----|-----|------|
| Write Pulse Width      | $t_W$      | $t_{WSA} = 2ns$ | 6   | 4   | —   | ns   |
| Data Setup Time        | $t_{WSD}$  |                 | 2   | 0   | —   | ns   |
| Data Hold Time         | $t_{WHD}$  |                 | 2   | 0   | —   | ns   |
| Address Setup Time     | $t_{WSA}$  | $t_W = 6ns$     | 2   | 0   | —   | ns   |
| Address Hold Time      | $t_{WHA}$  |                 | 2   | 0   | —   | ns   |
| Chip Select Setup Time | $t_{WSCS}$ |                 | 2   | 0   | —   | ns   |
| Chip Select Hold Time  | $t_{WHCS}$ |                 | 2   | 0   | —   | ns   |
| Write Disable Time     | $t_{WS}$   |                 | —   | 3   | 5   | ns   |
| Write Recovery Time    | $t_{WR}$   |                 | —   | 3   | 12  | ns   |

## 3. RISE/FALL TIME

| Item             | Symbol | Test Condition | min | typ | max | Unit |
|------------------|--------|----------------|-----|-----|-----|------|
| Output Rise Time | $t_r$  |                | —   | 2   | —   | ns   |
| Output Fall Time | $t_f$  |                | —   | 2   | —   | ns   |

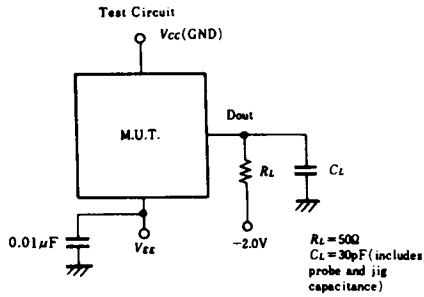
## 4. CAPACITANCE

| Item               | Symbol    | Test Condition | min | typ | max | Unit |
|--------------------|-----------|----------------|-----|-----|-----|------|
| Input Capacitance  | $C_{iA}$  |                | —   | 3   | —   | pF   |
| Output Capacitance | $C_{out}$ |                | —   | 5   | —   | pF   |

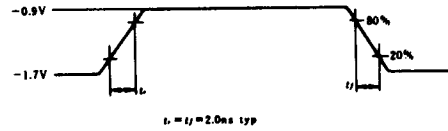


## ■ TEST CIRCUIT AND WAVEFORMS

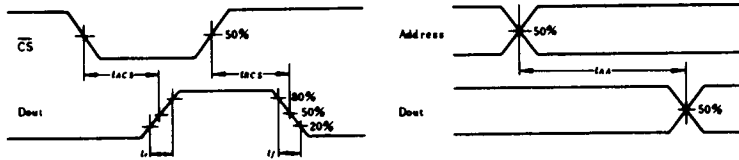
### 1. LOADING CONDITION



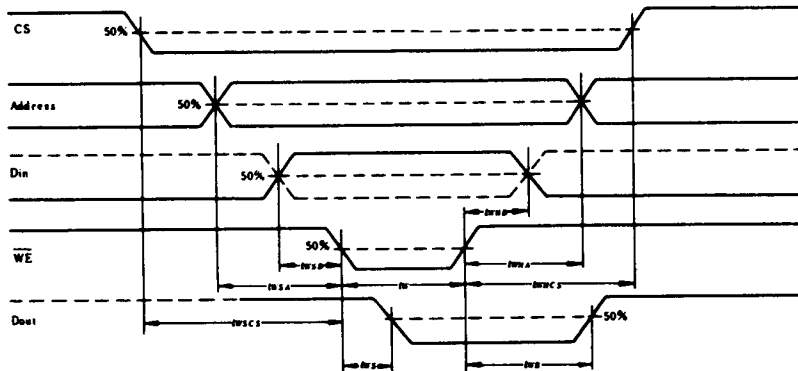
### 2. INPUT PULSE



### 3. READ MODE



### 4. WRITE MODE



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