



# CD4043BMS

# CD4044BMS

December 1992

## CMOS Quad 3 State R/S Latches

### Features

- High Voltage Types (20V Rating)
- Quad NOR R/S Latch- CD4043BMS
- Quad NAND R/S Latch - CD4044BMS
- 3 State Outputs with Common Output ENABLE
- Separate SET and RESET Inputs for Each Latch
- NOR and NAND Configuration
- 5V, 10V and 15V Parametric Ratings
- Standardized Symmetrical Output Characteristics
- 100% Tested for Quiescent Current at 20V
- Maximum Input Current of  $1\mu\text{A}$  at 18V Over Full Package-Temperature Range;
  - 100nA at 18V and 25°C
- Noise Margin (Over Full Package Temperature Range):
  - 1V at VDD = 5V
  - 2V at VDD = 10V
  - 2.5V at VDD = 15V
- Meets All Requirements of JEDEC Tentative Standard No. 13B, "Standard Specifications for Description of 'B' Series CMOS Devices"

### Applications

- Holding Register in Multi-Register System
- Four Bits of Independent Storage with Output ENABLE
- Strobed Register
- General Digital Logic
- CD4043BMS for Positive Logic Systems
- CD4044BMS for Negative Logic Systems

### Description

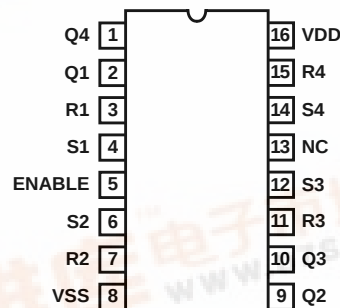
CD4043BMS types are quad cross-coupled 3-state CMOS NOR latches and the CD4044BMS types are quad cross-coupled 3-state CMOS NAND latches. Each latch has a separate Q output and individual SET and RESET inputs. The Q outputs are controlled by a common ENABLE input. A logic "1" or high on the ENABLE input connects the latch states to the Q outputs. A logic "0" or low on the ENABLE input disconnects the latch states from the Q outputs, results in an open circuit feature allows common busing of the outputs.

The CD4043BMS and CD4044BMS are supplied in these 16-lead outline packages:

|                  |               |      |
|------------------|---------------|------|
| Braze Seal DIP   | *H4T          | †H4T |
| Frit Seal DIP    | *H1C          | †H1E |
| Ceramic Flatpack | *H3X          | †H6W |
| *CD4043B Only    | †CD4044B Only |      |

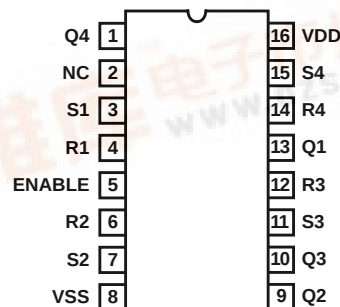
### Pinout

CD4043BMS  
TOP VIEW



NC = NO CONNECTION

CD4044BMS  
TOP VIEW



NC = NO CONNECTION

## Specifications CD4043BMS, CD4044BMS

### Absolute Maximum Ratings

DC Supply Voltage Range, (VDD) ..... -0.5V to +20V  
(Voltage Referenced to VSS Terminals)  
Input Voltage Range, All Inputs ..... -0.5V to VDD +0.5V  
DC Input Current, Any One Input .....  $\pm 10\text{mA}$   
Operating Temperature Range .....  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$   
Package Types D, F, K, H  
Storage Temperature Range (TSTG) .....  $-65^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$   
Lead Temperature (During Soldering) .....  $+265^{\circ}\text{C}$   
At Distance  $1/16 \pm 1/32$  Inch ( $1.59\text{mm} \pm 0.79\text{mm}$ ) from case for  
10s Maximum

### Reliability Information

Thermal Resistance .....  $\theta_{ja}$  .....  $\theta_{jc}$   
Ceramic DIP and FRIT Package .....  $80^{\circ}\text{C/W}$  .....  $20^{\circ}\text{C/W}$   
Flatpack Package .....  $70^{\circ}\text{C/W}$  .....  $20^{\circ}\text{C/W}$   
Maximum Package Power Dissipation (PD) at  $+125^{\circ}\text{C}$   
For TA =  $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$  (Package Type D, F, K) .....  $500\text{mW}$   
For TA =  $+100^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  (Package Type D, F, K) ..... Derate  
Linearity at  $12\text{mW}/^{\circ}\text{C}$  to  $200\text{mW}$   
Device Dissipation per Output Transistor .....  $100\text{mW}$   
For TA = Full Package Temperature Range (All Package Types)  
Junction Temperature .....  $+175^{\circ}\text{C}$

**TABLE 1. DC ELECTRICAL PERFORMANCE CHARACTERISTICS**

| PARAMETER                      | SYMBOL | CONDITIONS (NOTE 1)                   |           | GROUP A<br>SUBGROUPS | TEMPERATURE                                                            | LIMITS         |                | UNITS         |
|--------------------------------|--------|---------------------------------------|-----------|----------------------|------------------------------------------------------------------------|----------------|----------------|---------------|
|                                |        |                                       |           |                      |                                                                        | MIN            | MAX            |               |
| Supply Current                 | IDD    | VDD = 20V, VIN = VDD or GND           |           | 1                    | $+25^{\circ}\text{C}$                                                  | -              | 2              | $\mu\text{A}$ |
|                                |        |                                       |           | 2                    | $+125^{\circ}\text{C}$                                                 | -              | 200            | $\mu\text{A}$ |
|                                |        | VDD = 18V, VIN = VDD or GND           |           | 3                    | $-55^{\circ}\text{C}$                                                  | -              | 2              | $\mu\text{A}$ |
| Input Leakage Current          | IIL    | VIN = VDD or GND                      | VDD = 20  | 1                    | $+25^{\circ}\text{C}$                                                  | -100           | -              | nA            |
|                                |        |                                       |           | 2                    | $+125^{\circ}\text{C}$                                                 | -1000          | -              | nA            |
|                                |        |                                       | VDD = 18V | 3                    | $-55^{\circ}\text{C}$                                                  | -100           | -              | nA            |
| Input Leakage Current          | IIH    | VIN = VDD or GND                      | VDD = 20  | 1                    | $+25^{\circ}\text{C}$                                                  | -              | 100            | nA            |
|                                |        |                                       |           | 2                    | $+125^{\circ}\text{C}$                                                 | -              | 1000           | nA            |
|                                |        |                                       | VDD = 18V | 3                    | $-55^{\circ}\text{C}$                                                  | -              | 100            | nA            |
| Output Voltage                 | VOL15  | VDD = 15V, No Load                    |           | 1, 2, 3              | $+25^{\circ}\text{C}$ , $+125^{\circ}\text{C}$ , $-55^{\circ}\text{C}$ | -              | 50             | mV            |
| Output Voltage                 | VOH15  | VDD = 15V, No Load (Note 3)           |           | 1, 2, 3              | $+25^{\circ}\text{C}$ , $+125^{\circ}\text{C}$ , $-55^{\circ}\text{C}$ | 14.95          | -              | V             |
| Output Current (Sink)          | IOL5   | VDD = 5V, VOUT = 0.4V                 |           | 1                    | $+25^{\circ}\text{C}$                                                  | 0.53           | -              | mA            |
| Output Current (Sink)          | IOL10  | VDD = 10V, VOUT = 0.5V                |           | 1                    | $+25^{\circ}\text{C}$                                                  | 1.4            | -              | mA            |
| Output Current (Sink)          | IOL15  | VDD = 15V, VOUT = 1.5V                |           | 1                    | $+25^{\circ}\text{C}$                                                  | 3.5            | -              | mA            |
| Output Current (Source)        | IOH5A  | VDD = 5V, VOUT = 4.6V                 |           | 1                    | $+25^{\circ}\text{C}$                                                  | -              | -0.53          | mA            |
| Output Current (Source)        | IOH5B  | VDD = 5V, VOUT = 2.5V                 |           | 1                    | $+25^{\circ}\text{C}$                                                  | -              | -1.8           | mA            |
| Output Current (Source)        | IOH10  | VDD = 10V, VOUT = 9.5V                |           | 1                    | $+25^{\circ}\text{C}$                                                  | -              | -1.4           | mA            |
| Output Current (Source)        | IOH15  | VDD = 15V, VOUT = 13.5V               |           | 1                    | $+25^{\circ}\text{C}$                                                  | -              | -3.5           | mA            |
| N Threshold Voltage            | VNTH   | VDD = 10V, ISS = $-10\mu\text{A}$     |           | 1                    | $+25^{\circ}\text{C}$                                                  | -2.8           | -0.7           | V             |
| P Threshold Voltage            | VPTH   | VSS = 0V, IDD = $10\mu\text{A}$       |           | 1                    | $+25^{\circ}\text{C}$                                                  | 0.7            | 2.8            | V             |
| Functional                     | F      | VDD = 2.8V, VIN = VDD or GND          |           | 7                    | $+25^{\circ}\text{C}$                                                  | VOH ><br>VDD/2 | VOL <<br>VDD/2 | V             |
|                                |        | VDD = 20V, VIN = VDD or GND           |           | 7                    | $+25^{\circ}\text{C}$                                                  |                |                |               |
|                                |        | VDD = 18V, VIN = VDD or GND           |           | 8A                   | $+125^{\circ}\text{C}$                                                 |                |                |               |
|                                |        | VDD = 3V, VIN = VDD or GND            |           | 8B                   | $-55^{\circ}\text{C}$                                                  |                |                |               |
| Input Voltage Low<br>(Note 2)  | VIL    | VDD = 5V, VOH > 4.5V, VOL < 0.5V      |           | 1, 2, 3              | $+25^{\circ}\text{C}$ , $+125^{\circ}\text{C}$ , $-55^{\circ}\text{C}$ | -              | 1.5            | V             |
| Input Voltage High<br>(Note 2) | VIH    | VDD = 5V, VOH > 4.5V, VOL < 0.5V      |           | 1, 2, 3              | $+25^{\circ}\text{C}$ , $+125^{\circ}\text{C}$ , $-55^{\circ}\text{C}$ | 3.5            | -              | V             |
| Input Voltage Low<br>(Note 2)  | VIL    | VDD = 15V, VOH > 13.5V,<br>VOL < 1.5V |           | 1, 2, 3              | $+25^{\circ}\text{C}$ , $+125^{\circ}\text{C}$ , $-55^{\circ}\text{C}$ | -              | 4              | V             |
| Input Voltage High<br>(Note 2) | VIH    | VDD = 15V, VOH > 13.5V,<br>VOL < 1.5V |           | 1, 2, 3              | $+25^{\circ}\text{C}$ , $+125^{\circ}\text{C}$ , $-55^{\circ}\text{C}$ | 11             | -              | V             |
| Tri-State Output<br>Leakage    | IOZL   | VIN = VDD or GND<br>VOUT = 0V         | VDD = 20V | 1                    | $+25^{\circ}\text{C}$                                                  | -0.4           | -              | $\mu\text{A}$ |
|                                |        |                                       |           | 2                    | $+125^{\circ}\text{C}$                                                 | -12            | -              | $\mu\text{A}$ |
|                                |        |                                       | VDD = 18V | 3                    | $-55^{\circ}\text{C}$                                                  | -0.4           | -              | $\mu\text{A}$ |
| Tri-State Output<br>Leakage    | IOZH   | VIN = VDD or GND<br>VOUT = VDD        | VDD = 20V | 1                    | $+25^{\circ}\text{C}$                                                  | -              | 0.4            | $\mu\text{A}$ |
|                                |        |                                       |           | 2                    | $+125^{\circ}\text{C}$                                                 | -              | 12             | $\mu\text{A}$ |
|                                |        |                                       | VDD = 18V | 3                    | $-55^{\circ}\text{C}$                                                  | -              | 0.4            | $\mu\text{A}$ |

NOTES: 1. All voltages referenced to device GND, 100% testing being implemented. 3. For accuracy, voltage is measured differentially to VDD. Limit is 0.050V max.  
2. Go/No Go test with limits applied to inputs.

## Specifications CD4043BMS, CD4044BMS

**TABLE 2. AC ELECTRICAL PERFORMANCE CHARACTERISTICS**

| PARAMETER                                  | SYMBOL       | CONDITIONS                                 | GROUP A<br>SUBGROUPS | TEMPERATURE   | LIMITS |     | UNITS |
|--------------------------------------------|--------------|--------------------------------------------|----------------------|---------------|--------|-----|-------|
|                                            |              |                                            |                      |               | MIN    | MAX |       |
| Propagation Delay<br>Set or Reset to Q     | TPHL<br>TPLH | VDD = 5V, VIN = VDD or GND<br>(Notes 1, 2) | 9                    | +25°C         | -      | 300 | ns    |
|                                            |              |                                            | 10, 11               | +125°C, -55°C | -      | 405 | ns    |
| Propagation Delay<br>3 - State Enable to Q | TPHZ<br>TPZH | VDD = 5V, VIN = VDD or GND<br>(Notes 2, 3) | 9                    | +25°C         | -      | 230 | ns    |
|                                            |              |                                            | 10, 11               | +125°C, -55°C | -      | 311 | ns    |
| Propagation Delay<br>3 - State Enable to Q | TPLZ<br>TPZL | VDD = 5V, VIN = VDD or GND<br>(Notes 2, 3) | 9                    | +25°C         | -      | 180 | ns    |
|                                            |              |                                            | 10, 11               | +125°C, -55°C | -      | 243 | ns    |
| Transition Time                            | TTHL<br>TTLH | VDD = 5V, VIN = VDD or GND<br>(Notes 1, 2) | 9                    | +25°C         | -      | 200 | ns    |
|                                            |              |                                            | 10, 11               | +125°C, -55°C | -      | 270 | ns    |

NOTES:

1. CL = 50pF, RL = 200K, Input TR, TF < 20ns.
2. -55°C and +125°C limits guaranteed, 100% testing being implemented.
1. CL = 50pF, RL = 1K, Input TR, TF < 20ns.

**TABLE 3. ELECTRICAL PERFORMANCE CHARACTERISTICS**

| PARAMETER               | SYMBOL | CONDITIONS                  | NOTES | TEMPERATURE             | LIMITS |       | UNITS |
|-------------------------|--------|-----------------------------|-------|-------------------------|--------|-------|-------|
|                         |        |                             |       |                         | MIN    | MAX   |       |
| Supply Current          | IDD    | VDD = 5V, VIN = VDD or GND  | 1, 2  | -55°C, +25°C            | -      | 1     | μA    |
|                         |        |                             |       | +125°C                  | -      | 30    | μA    |
|                         |        | VDD = 10V, VIN = VDD or GND | 1, 2  | -55°C, +25°C            | -      | 2     | μA    |
|                         |        |                             |       | +125°C                  | -      | 60    | μA    |
|                         |        | VDD = 15V, VIN = VDD or GND | 1, 2  | -55°C, +25°C            | -      | 2     | μA    |
|                         |        |                             |       | +125°C                  | -      | 120   | μA    |
| Output Voltage          | VOL    | VDD = 5V, No Load           | 1, 2  | +25°C, +125°C,<br>-55°C | -      | 50    | mV    |
| Output Voltage          | VOL    | VDD = 10V, No Load          | 1, 2  | +25°C, +125°C,<br>-55°C | -      | 50    | mV    |
| Output Voltage          | VOH    | VDD = 5V, No Load           | 1, 2  | +25°C, +125°C,<br>-55°C | 4.95   | -     | V     |
| Output Voltage          | VOH    | VDD = 10V, No Load          | 1, 2  | +25°C, +125°C,<br>-55°C | 9.95   | -     | V     |
| Output Current (Sink)   | IOL5   | VDD = 5V, VOUT = 0.4V       | 1, 2  | +125°C                  | 0.36   | -     | mA    |
|                         |        |                             |       | -55°C                   | 0.64   | -     | mA    |
| Output Current (Sink)   | IOL10  | VDD = 10V, VOUT = 0.5V      | 1, 2  | +125°C                  | 0.9    | -     | mA    |
|                         |        |                             |       | -55°C                   | 1.6    | -     | mA    |
| Output Current (Sink)   | IOL15  | VDD = 15V, VOUT = 1.5V      | 1, 2  | +125°C                  | 2.4    | -     | mA    |
|                         |        |                             |       | -55°C                   | 4.2    | -     | mA    |
| Output Current (Source) | IOH5A  | VDD = 5V, VOUT = 4.6V       | 1, 2  | +125°C                  | -      | -0.36 | mA    |
|                         |        |                             |       | -55°C                   | -      | -0.64 | mA    |
| Output Current (Source) | IOH5B  | VDD = 5V, VOUT = 2.5V       | 1, 2  | +125°C                  | -      | -1.15 | mA    |
|                         |        |                             |       | -55°C                   | -      | -2.0  | mA    |
| Output Current (Source) | IOH10  | VDD = 10V, VOUT = 9.5V      | 1, 2  | +125°C                  | -      | -0.9  | mA    |
|                         |        |                             |       | -55°C                   | -      | -1.6  | mA    |
| Output Current (Source) | IOH15  | VDD = 15V, VOUT = 13.5V     | 1, 2  | +125°C                  | -      | -2.4  | mA    |
|                         |        |                             |       | -55°C                   | -      | -4.2  | mA    |

## Specifications CD4043BMS, CD4044BMS

**TABLE 3. ELECTRICAL PERFORMANCE CHARACTERISTICS (Continued)**

| PARAMETER                             | SYMBOL       | CONDITIONS                    | NOTES   | TEMPERATURE          | LIMITS |     | UNITS |
|---------------------------------------|--------------|-------------------------------|---------|----------------------|--------|-----|-------|
|                                       |              |                               |         |                      | MIN    | MAX |       |
| Input Voltage Low                     | VIL          | VDD = 10V, VOH > 9V, VOL < 1V | 1, 2    | +25°C, +125°C, -55°C | -      | 3   | V     |
| Input Voltage High                    | VIH          | VDD = 10V, VOH > 9V, VOL < 1V | 1, 2    | +25°C, +125°C, -55°C | 7      | -   | V     |
| Propagation Delay Set or Reset to Q   | TPLH<br>TPHL | VDD = 10V                     | 1, 2, 3 | +25°C                | -      | 140 | ns    |
|                                       |              | VDD = 15V                     | 1, 2, 3 | +25°C                | -      | 100 | ns    |
| Propagation Delay 3 State Enable to Q | TPHZ<br>TPZH | VDD = 10V                     | 1, 2, 4 | +25°C                | -      | 110 | ns    |
|                                       |              | VDD = 15V                     | 1, 2, 4 | +25°C                | -      | 80  | ns    |
| Propagation Delay 3 State Enable to Q | TPLZ<br>TPZL | VDD = 10V                     | 1, 2, 4 | +25°C                | -      | 100 | ns    |
|                                       |              | VDD = 15V                     | 1, 2, 4 | +25°C                | -      | 70  | ns    |
| Transition Time                       | TTHL<br>TTLH | VDD = 10V                     | 1, 2, 3 | +25°C                | -      | 100 | ns    |
|                                       |              | VDD = 15V                     | 1, 2, 3 | +25°C                | -      | 80  | ns    |
| Minimum Set or Reset Pulse Width      | TW           | VDD = 5V                      | 1, 2, 3 | +25°C                | -      | 160 | ns    |
|                                       |              | VDD = 10V                     | 1, 2, 3 | +25°C                | -      | 80  | ns    |
|                                       |              | VDD = 15V                     | 1, 2, 3 | +25°C                | -      | 40  | ns    |
| Input Capacitance                     | CIN          | Any Input                     | 1, 2    | +25°C                | -      | 7.5 | pF    |

**NOTES:**

1. All voltages referenced to device GND.
2. The parameters listed on Table 3 are controlled via design or process and are not directly tested. These parameters are characterized on initial design release and upon design changes which would affect these characteristics.
3. CL = 50pF, RL = 200K, Input TR, TF < 20ns.
4. CL = 50pF, RL = 1K, Input TR, TF < 20ns.

**TABLE 4. POST IRRADIATION ELECTRICAL PERFORMANCE CHARACTERISTICS**

| PARAMETER                 | SYMBOL       | CONDITIONS                  | NOTES      | TEMPERATURE | LIMITS      |                    | UNITS |
|---------------------------|--------------|-----------------------------|------------|-------------|-------------|--------------------|-------|
|                           |              |                             |            |             | MIN         | MAX                |       |
| Supply Current            | IDD          | VDD = 20V, VIN = VDD or GND | 1, 4       | +25°C       | -           | 7.5                | μA    |
| N Threshold Voltage       | VNTH         | VDD = 10V, ISS = -10μA      | 1, 4       | +25°C       | -2.8        | -0.2               | V     |
| N Threshold Voltage Delta | ΔVTN         | VDD = 10V, ISS = -10μA      | 1, 4       | +25°C       | -           | ±1                 | V     |
| P Threshold Voltage       | VTP          | VSS = 0V, IDD = 10μA        | 1, 4       | +25°C       | 0.2         | 2.8                | V     |
| P Threshold Voltage Delta | ΔVTP         | VSS = 0V, IDD = 10μA        | 1, 4       | +25°C       | -           | ±1                 | V     |
| Functional                | F            | VDD = 18V, VIN = VDD or GND | 1          | +25°C       | VOH > VDD/2 | VOL < VDD/2        | V     |
|                           |              | VDD = 3V, VIN = VDD or GND  |            |             |             |                    |       |
| Propagation Delay Time    | TPHL<br>TPLH | VDD = 5V                    | 1, 2, 3, 4 | +25°C       | -           | 1.35 x +25°C Limit | ns    |

- NOTES: 1. All voltages referenced to device GND. 2. CL = 50pF, RL = 200K, Input TR, TF < 20ns. 3. See Table 2 for +25°C limit. 4. Read and Record

**TABLE 5. BURN-IN AND LIFE TEST DELTA PARAMETERS +25°C**

| PARAMETER               | SYMBOL | DELTA LIMIT              |
|-------------------------|--------|--------------------------|
| Supply Current - MSI-1  | IDD    | ± 0.2μA                  |
| Output Current (Sink)   | IOL5   | ± 20% x Pre-Test Reading |
| Output Current (Source) | IOH5A  | ± 20% x Pre-Test Reading |

## Specifications CD4043BMS, CD4044BMS

**TABLE 6. APPLICABLE SUBGROUPS**

| CONFORMANCE GROUP             |              | MIL-STD-883 METHOD | GROUP A SUBGROUPS                     | READ AND RECORD              |
|-------------------------------|--------------|--------------------|---------------------------------------|------------------------------|
| Initial Test (Pre Burn-In)    |              | 100% 5004          | 1, 7, 9                               | IDD, IOL5, IOH5A             |
| Interim Test 1 (Post Burn-In) |              | 100% 5004          | 1, 7, 9                               | IDD, IOL5, IOH5A             |
| Interim Test 2 (Post Burn-In) |              | 100% 5004          | 1, 7, 9                               | IDD, IOL5, IOH5A             |
| PDA (Note 1)                  |              | 100% 5004          | 1, 7, 9, Deltas                       |                              |
| Interim Test 3 (Post Burn-In) |              | 100% 5004          | 1, 7, 9                               | IDD, IOL5, IOH5A             |
| PDA (Note 1)                  |              | 100% 5004          | 1, 7, 9, Deltas                       |                              |
| Final Test                    |              | 100% 5004          | 2, 3, 8A, 8B, 10, 11                  |                              |
| Group A                       |              | Sample 5005        | 1, 2, 3, 7, 8A, 8B, 9, 10, 11         |                              |
| Group B                       | Subgroup B-5 | Sample 5005        | 1, 2, 3, 7, 8A, 8B, 9, 10, 11, Deltas | Subgroups 1, 2, 3, 9, 10, 11 |
|                               | Subgroup B-6 | Sample 5005        | 1, 7, 9                               |                              |
| Group D                       |              | Sample 5005        | 1, 2, 3, 8A, 8B, 9                    | Subgroups 1, 2 3             |

NOTE: 1. 5% Parametric, 3% Functional; Cumulative for Static 1 and 2.

**TABLE 7. TOTAL DOSE IRRADIATION**

| CONFORMANCE GROUPS | MIL-STD-883 METHOD | TEST      |            | READ AND RECORD |            |
|--------------------|--------------------|-----------|------------|-----------------|------------|
|                    |                    | PRE-IRRAD | POST-IRRAD | PRE-IRRAD       | POST-IRRAD |
| Group E Subgroup 2 | 5005               | 1, 7, 9   | Table 4    | 1, 9            | Table 4    |

**TABLE 8. BURN-IN AND IRRADIATION TEST CONNECTIONS**

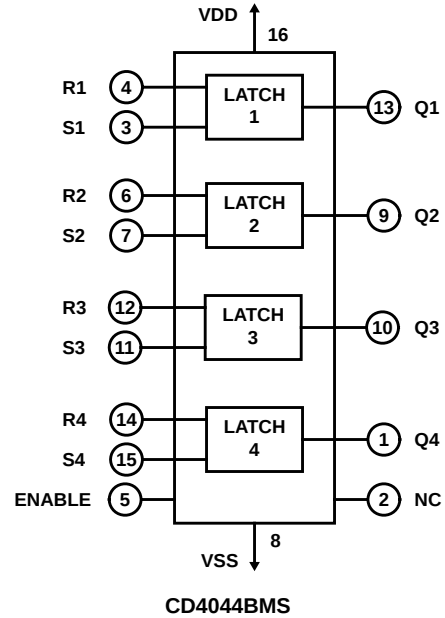
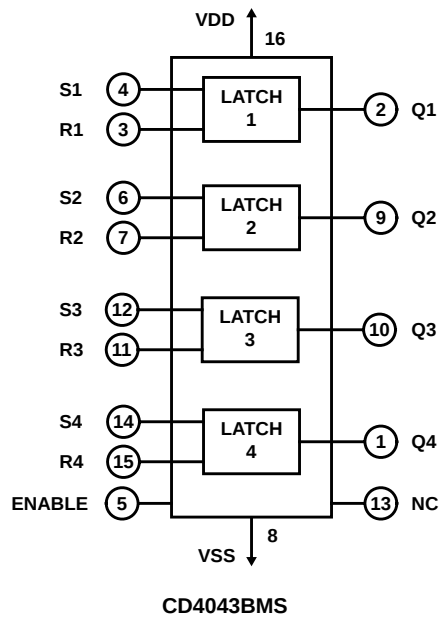
| FUNCTION                   | OPEN            | GROUND                | VDD                    | 9V ± -0.5V   | OSCILLATOR   |              |
|----------------------------|-----------------|-----------------------|------------------------|--------------|--------------|--------------|
|                            |                 |                       |                        |              | 50kHz        | 25kHz        |
| PART NUMBER                | CD4043BMS       |                       |                        |              |              |              |
| Static Burn-In 1<br>Note 1 | 1, 2, 9, 10, 13 | 3 - 8, 11, 12, 14, 15 | 16                     |              |              |              |
| Static Burn-In 2<br>Note 1 | 1, 2, 9, 10, 13 | 8                     | 3 - 7, 11, 12, 14 - 16 |              |              |              |
| Dynamic Burn-In<br>Note 1  | 13              | 8                     | 5, 16                  | 1, 2, 9, 12  | 4, 6, 12, 14 | 3, 7, 11, 15 |
| Irradiation<br>Note 2      | 1, 2, 9, 10, 13 | 8                     | 3 - 7, 11, 12, 14 - 16 |              |              |              |
| PART NUMBER                | CD4044BMS       |                       |                        |              |              |              |
| Static Burn-In 1<br>Note 1 | 1, 2, 9, 10, 13 | 3 - 8, 11, 12, 14, 15 | 16                     |              |              |              |
| Static Burn-In 2<br>Note 1 | 1, 2, 9, 10, 13 | 8                     | 3 - 7, 11, 12, 14 - 16 |              |              |              |
| Dynamic Burn-In<br>Note 1  | 2               | 8                     | 5, 16                  | 1, 9, 10, 13 | 4, 6, 12, 14 | 3, 7, 11, 15 |
| Irradiation<br>Note 2      | 1, 2, 9, 10, 13 | 8                     | 3 - 7, 11, 12, 14 - 16 |              |              |              |

NOTE:

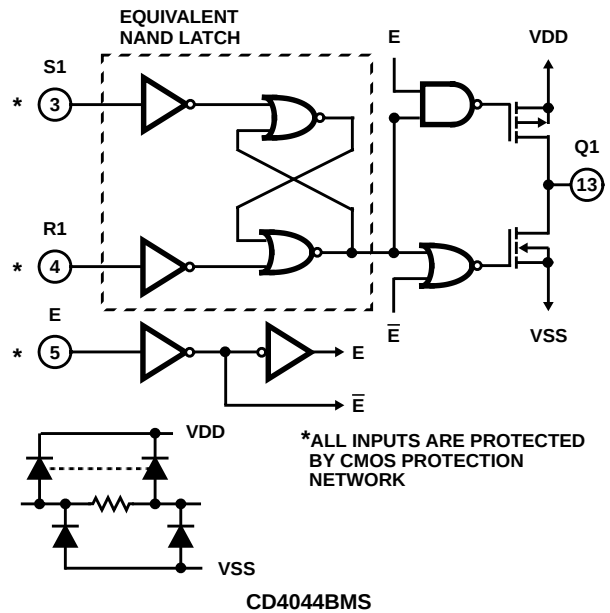
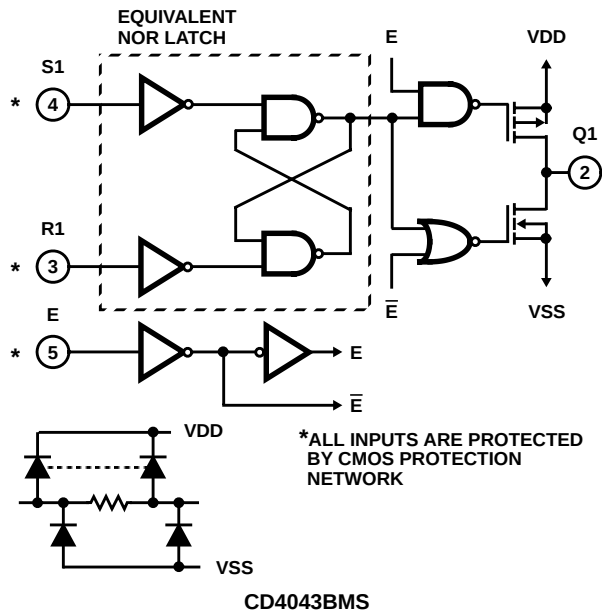
- Each pin except VDD and GND will have a series resistor of 10K ± 5%, VDD = 18V ± 0.5V
- Each pin except VDD and GND will have a series resistor of 47K ± 5%; Group E, Subgroup 2, sample size is 4 dice/wafer, 0 failures, VDD = 10V ± 0.5V

## Specifications CD4043BMS, CD4044BMS

### Functional Diagram



### Logic Diagram



### TRUTH TABLE

CD4043BMS

| S | R | E | Q    |
|---|---|---|------|
| X | X | O | OC*  |
| O | O | 1 | NC** |
| 1 | O | 1 | 1    |
| O | 1 | 1 | O    |
| 1 | 1 | 1 | Δ    |

\* Open Circuit

\*\* No Change

Δ Dominated by S = 1 input

CD4044BMS

| S | R | E | Q    |
|---|---|---|------|
| X | X | O | OC*  |
| 1 | 1 | 1 | NC** |
| O | 1 | 1 | 1    |
| 1 | O | 1 | O    |
| O | O | 1 | ΔΔ   |

\* Open Circuit

\*\* No Change

ΔΔ Dominated by R = O input

## CD4043BMS, CD4044BMS

### Typical Performance Characteristics

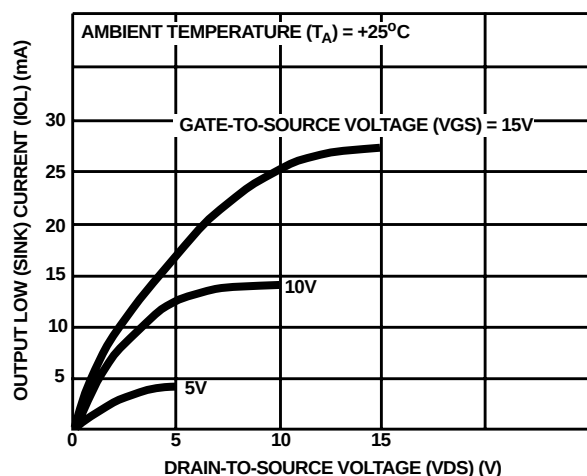


FIGURE 1. TYPICAL OUTPUT LOW (SINK) CURRENT CHARACTERISTICS

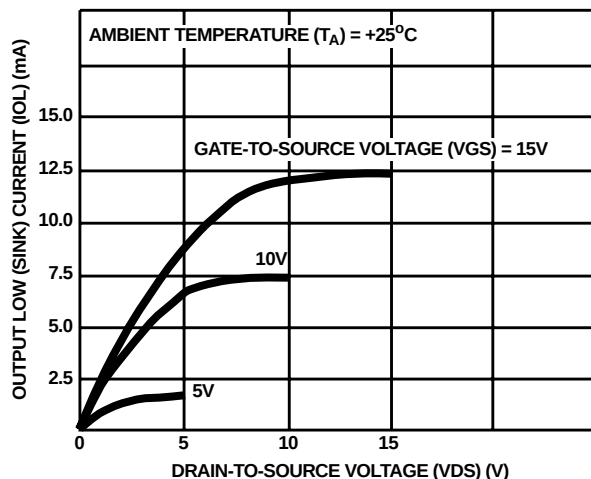


FIGURE 2. MINIMUM OUTPUT LOW (SINK) CURRENT CHARACTERISTICS

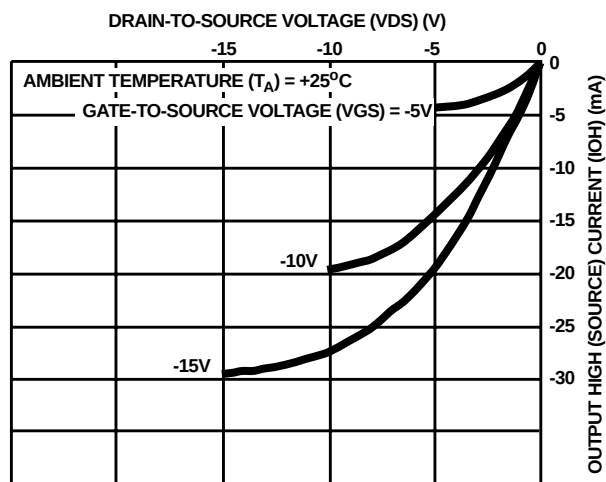


FIGURE 3. TYPICAL OUTPUT HIGH (SOURCE) CURRENT CHARACTERISTICS

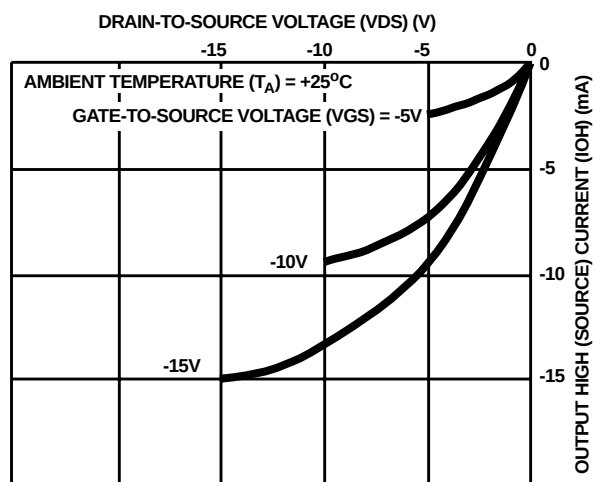


FIGURE 4. MINIMUM OUTPUT HIGH (SOURCE) CURRENT CHARACTERISTICS

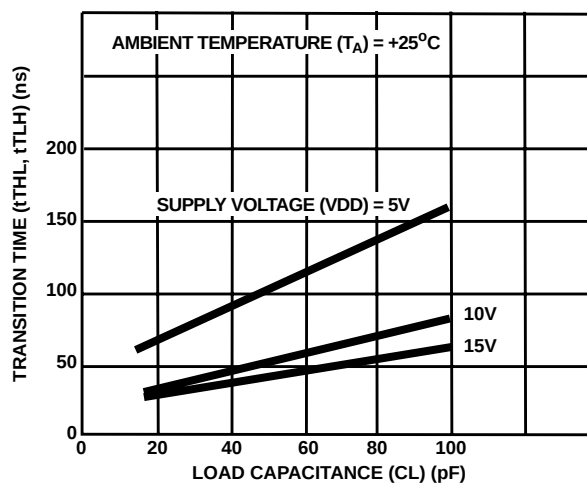


FIGURE 5. TYPICAL TRANSITION TIME AS A FUNCTION OF LOAD CAPACITANCE

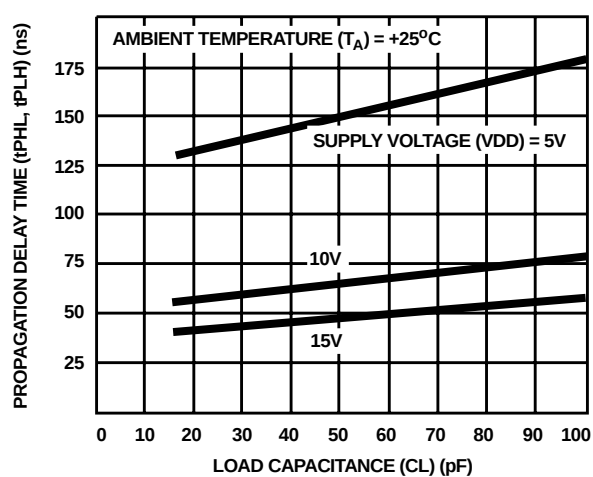


FIGURE 6. TYPICAL PROPAGATION DELAY TIME vs LOAD CAPACITANCE - SET, RESET, to Q,  $\bar{Q}$

## CD4043BMS, CD4044BMS

### Typical Performance Characteristics (Continued)

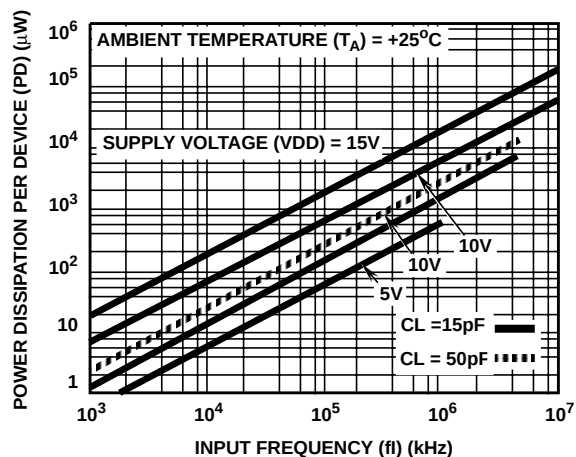


FIGURE 7. TYPICAL POWER DISSIPATION vs FREQUENCY

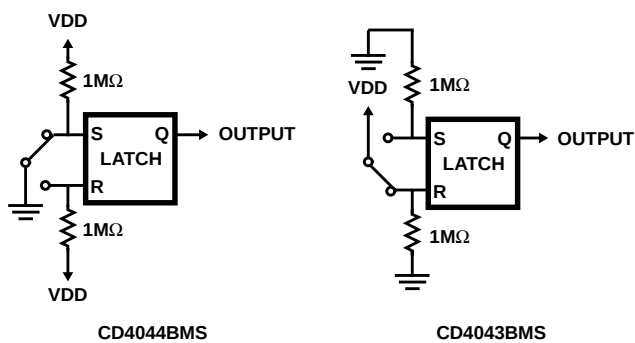


FIGURE 8. SWITCH BOUNCE ELIMINATOR

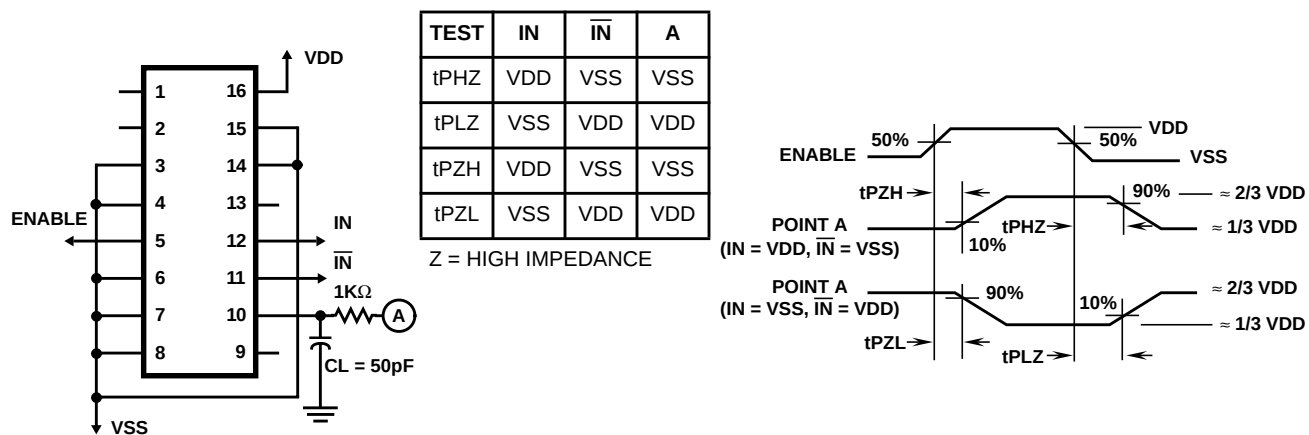


FIGURE 9. ENABLE PROPAGATION DELAY TIME TEST CIRCUIT AND WAVEFORM

# CD4043BMS

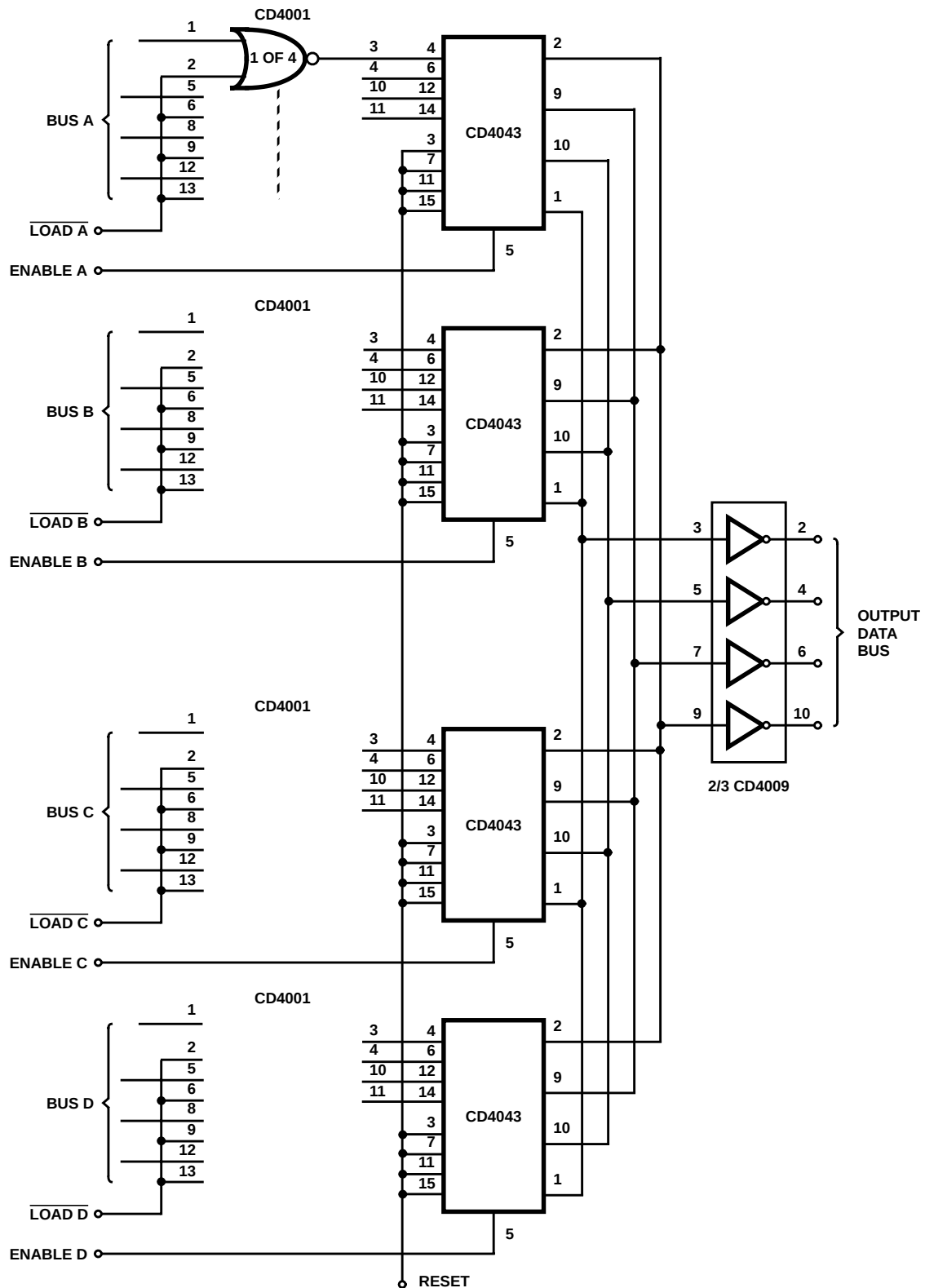
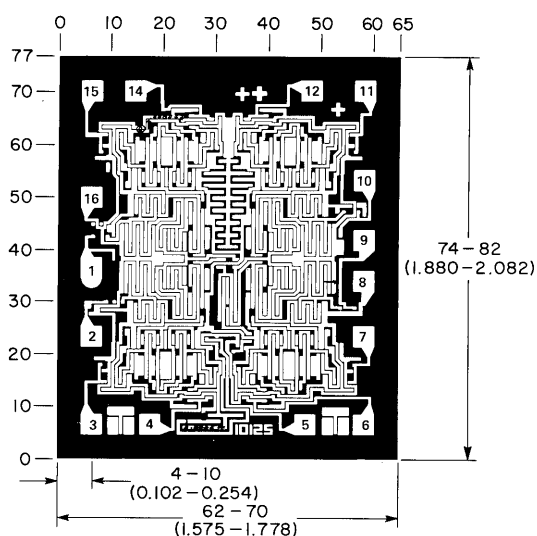


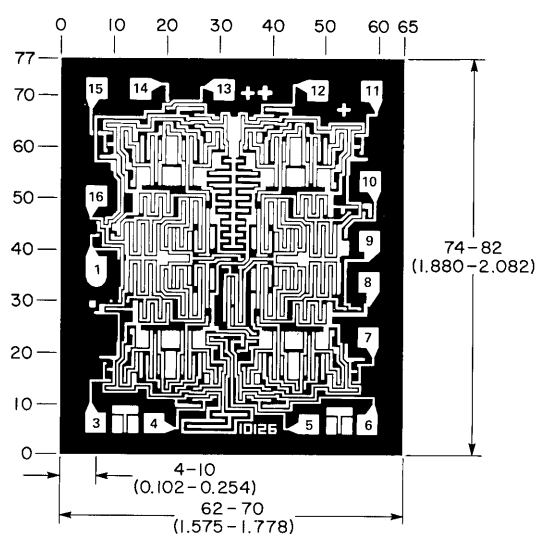
FIGURE 10. MULTIPLE BUS STORAGE

## CD4043BMS

### Chip Dimensions and Pad Layouts



CD4043BMSH



CD4044BMSH

Dimensions in parentheses are in millimeters  
and are derived from the basic inch dimensions  
as indicated. Grid graduations are in mils ( $10^{-3}$  inch)

**METALLIZATION:** Thickness:  $11\text{k}\text{\AA} - 14\text{k}\text{\AA}$ , AL.

**PASSIVATION:**  $10.4\text{k}\text{\AA} - 15.6\text{k}\text{\AA}$ , Silane

**BOND PADS:** 0.004 inches X 0.004 inches MIN

**DIE THICKNESS:** 0.0198 inches - 0.0218 inches

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