

December 1992

## CMOS Dual 4-Bit Latch

### Features

- High-Voltage Types (20-Volt Rating)
- Two Independent 4-Bit Latches
- Individual Master Reset for Each 4-Bit Latch
- 3-State Outputs with High-Impedance State for Bus Line Applications
- Medium-Speed Operation:  $t_{PHL} = t_{PLH} = 70\text{nS}$  (Typ.) at  $V_{DD} = 10\text{V}$  and  $C_L = 50\text{pF}$
- 100% Tested for Quiescent Current at 20V
- 5V, 10V, and 15V Parametric Ratings
- Standardized, Symmetrical Output Characteristics
- Maximum Input Current of  $1\mu\text{A}$  at 18V Over Full Package Temperature Range;  $100\text{nA}$  at 18V and  $25^\circ\text{C}$
- Noise Margin (Full Package-Temperature Range):
  - 1V at  $V_{DD} = 5\text{V}$
  - 2V at  $V_{DD} = 10\text{V}$
  - 2.5V at  $V_{DD} = 15\text{V}$
- Meets all Requirements of JEDEC Tentative Standard No. 13B, "Standard Specifications for Description of 'B' Series CMOS Devices"

### Applications

- Buffer Storage
- Holding Registers
- Data Storage and Multiplexing

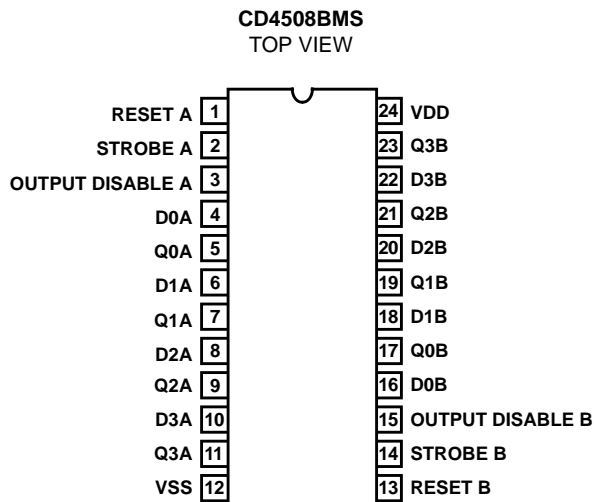
### Description

CD4508BMS dual 4-bit latch contains two identical 4-bit latches with separate STROBE, RESET, and OUTPUT DISABLE controls. With the STROBE line in the high state, the data on the "D" inputs appear at the corresponding "Q" outputs provided the DISABLE line is in the low state. Changing the STROBE line to the low state locks the data into the latch. A high on the reset line forces the outputs to a low level regardless of the state of the STROBE input. The outputs are forced to the high-impedance state for bus line applications by a high level on the DISABLE input.

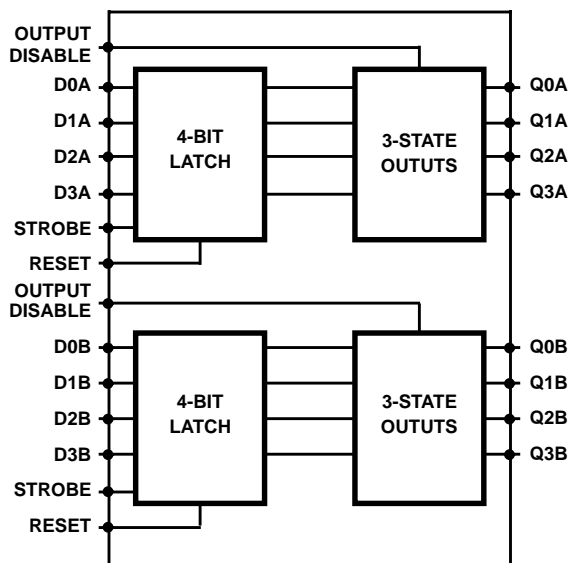
The CD4508BMS is supplied in these 24 lead outline packages:

|                  |     |
|------------------|-----|
| Braze Seal DIP   | H4V |
| Frit Seal DIP    | H1Z |
| Ceramic Flatpack | H4P |

### Pinout



### Functional Diagram



# Specifications CD4508BMS

## 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 .....  $\pm 10\mu\text{A}$   
 Operating Temperature Range ..... -55°C to +125°C  
 Package Types D, F, K, H  
 Storage Temperature Range (TSTG) ..... -65°C to +150°C  
 Lead Temperature (During Soldering) ..... +265°C  
 At Distance 1/16  $\pm$  1/32 Inch (1.59mm  $\pm$  0.79mm) from case for  
 10s Maximum

## Reliability Information

Thermal Resistance .....  $\theta_{ja}$  .....  $\theta_{jc}$   
 Ceramic DIP and FRIT Package ..... 80°C/W ..... 20°C/W  
 Flatpack Package ..... 70°C/W ..... 20°C/W  
 Maximum Package Power Dissipation (PD) at +125°C  
 For  $T_A = -55^\circ\text{C}$  to +100°C (Package Type D, F, K) ..... 500mW  
 For  $T_A = +100^\circ\text{C}$  to +125°C (Package Type D, F, K) ..... Derate  
 Linearity at 12mW/°C to 200mW  
 Device Dissipation per Output Transistor ..... 100mW  
 For  $T_A =$  Full Package Temperature Range (All Package Types)  
 Junction Temperature ..... +175°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°C                | -              | 10             | $\mu\text{A}$ |
|                                |        |                                       |           | 2                    | +125°C               | -              | 1000           | $\mu\text{A}$ |
|                                |        | VDD = 18V, VIN = VDD or GND           |           | 3                    | -55°C                | -              | 10             | $\mu\text{A}$ |
| Input Leakage Current          | IIL    | VIN = VDD or GND                      | VDD = 20  | 1                    | +25°C                | -100           | -              | nA            |
|                                |        |                                       |           | 2                    | +125°C               | -1000          | -              | nA            |
|                                |        |                                       | VDD = 18V | 3                    | -55°C                | -100           | -              | nA            |
| Input Leakage Current          | IIH    | VIN = VDD or GND                      | VDD = 20  | 1                    | +25°C                | -              | 100            | nA            |
|                                |        |                                       |           | 2                    | +125°C               | -              | 1000           | nA            |
|                                |        |                                       | VDD = 18V | 3                    | -55°C                | -              | 100            | nA            |
| Output Voltage                 | VOL15  | VDD = 15V, No Load                    |           | 1, 2, 3              | +25°C, +125°C, -55°C | -              | 50             | mV            |
| Output Voltage                 | VOH15  | VDD = 15V, No Load (Note 3)           |           | 1, 2, 3              | +25°C, +125°C, -55°C | 14.95          | -              | V             |
| Output Current (Sink)          | IOL5   | VDD = 5V, VOUT = 0.4V                 |           | 1                    | +25°C                | 0.53           | -              | mA            |
| Output Current (Sink)          | IOL10  | VDD = 10V, VOUT = 0.5V                |           | 1                    | +25°C                | 1.4            | -              | mA            |
| Output Current (Sink)          | IOL15  | VDD = 15V, VOUT = 1.5V                |           | 1                    | +25°C                | 3.5            | -              | mA            |
| Output Current (Source)        | IOH5A  | VDD = 5V, VOUT = 4.6V                 |           | 1                    | +25°C                | -              | -0.53          | mA            |
| Output Current (Source)        | IOH5B  | VDD = 5V, VOUT = 2.5V                 |           | 1                    | +25°C                | -              | -1.8           | mA            |
| Output Current (Source)        | IOH10  | VDD = 10V, VOUT = 9.5V                |           | 1                    | +25°C                | -              | -1.4           | mA            |
| Output Current (Source)        | IOH15  | VDD = 15V, VOUT = 13.5V               |           | 1                    | +25°C                | -              | -3.5           | mA            |
| N Threshold Voltage            | VNTH   | VDD = 10V, ISS = -10 $\mu\text{A}$    |           | 1                    | +25°C                | -2.8           | -0.7           | V             |
| P Threshold Voltage            | VPTH   | VSS = 0V, IDD = 10 $\mu\text{A}$      |           | 1                    | +25°C                | 0.7            | 2.8            | V             |
| Functional                     | F      | VDD = 2.8V, VIN = VDD or GND          |           | 7                    | +25°C                | VOH ><br>VDD/2 | VOL <<br>VDD/2 | V             |
|                                |        | VDD = 20V, VIN = VDD or GND           |           | 7                    | +25°C                |                |                |               |
|                                |        | VDD = 18V, VIN = VDD or GND           |           | 8A                   | +125°C               |                |                |               |
|                                |        | VDD = 3V, VIN = VDD or GND            |           | 8B                   | -55°C                |                |                |               |
| Input Voltage Low<br>(Note 2)  | VIL    | VDD = 5V, VOH > 4.5V, VOL < 0.5V      |           | 1, 2, 3              | +25°C, +125°C, -55°C | -              | 1.5            | V             |
| Input Voltage High<br>(Note 2) | VIH    | VDD = 5V, VOH > 4.5V, VOL < 0.5V      |           | 1, 2, 3              | +25°C, +125°C, -55°C | 3.5            | -              | V             |
| Input Voltage Low<br>(Note 2)  | VIL    | VDD = 15V, VOH > 13.5V,<br>VOL < 1.5V |           | 1, 2, 3              | +25°C, +125°C, -55°C | -              | 4              | V             |
| Input Voltage High<br>(Note 2) | VIH    | VDD = 15V, VOH > 13.5V,<br>VOL < 1.5V |           | 1, 2, 3              | +25°C, +125°C, -55°C | 11             | -              | V             |
| Tri-State Output<br>Leakage    | IOZL   | VIN = VDD or GND<br>VOUT = 0V         | VDD = 20V | 1                    | +25°C                | -0.4           | -              | $\mu\text{A}$ |
|                                |        |                                       |           | 2                    | +125°C               | -12            | -              | $\mu\text{A}$ |
|                                |        |                                       | VDD = 18V | 3                    | -55°C                | -0.4           | -              | $\mu\text{A}$ |
| Tri-State Output<br>Leakage    | IOZH   | VIN = VDD or GND<br>VOUT = VDD        | VDD = 20V | 1                    | +25°C                | -              | 0.4            | $\mu\text{A}$ |
|                                |        |                                       |           | 2                    | +125°C               | -              | 12             | $\mu\text{A}$ |
|                                |        |                                       | VDD = 18V | 3                    | -55°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.

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**TABLE 2. AC ELECTRICAL PERFORMANCE CHARACTERISTICS**

| PARAMETER                                  | SYMBOL         | CONDITIONS                                | GROUP A<br>SUBGROUPS | TEMPERATURE   | LIMITS |     | UNITS |
|--|----------------|---|----------------------|---------------|--------|-----|-------|
|  |                |   |                      |               | MIN    | MAX |       |
| Propagation Delay<br>Strobe In to Data Out | TPHL1<br>TPLH1 | VDD = 5V, VIN = VDD or GND<br>(Note 1, 2) | 9                    | +25°C         | -      | 260 | ns    |
|  |                |   | 10, 11               | +125°C, -55°C | -      | 351 | ns    |
| Transition Time                            | TTHL<br>TTLH   | VDD = 5V, VIN = VDD or GND<br>(Note 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.

**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            | -      | 5     | μA    |
|  |                |                               |         | +125°C                  | -      | 150   | μA    |
|  |                | VDD = 10V, VIN = VDD or GND   | 1, 2    | -55°C, +25°C            | -      | 10    | μA    |
|  |                |                               |         | +125°C                  | -      | 300   | μA    |
|  |                | VDD = 15V, VIN = VDD or GND   | 1, 2    | -55°C, +25°C            | -      | 10    | μA    |
|  |                |                               |         | +125°C                  | -      | 600   | 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    |
| Input Voltage Low                          | VIL            | VDD = 10V, VOH > 9V, VOL < 1V | 1, 2    | +25°C, +125°C,<br>-55°C | -      | 3     | V     |
| Input Voltage High                         | VIH            | VDD = 10V, VOH > 9V, VOL < 1V | 1, 2    | +25°C, +125°C,<br>-55°C | +7     | -     | V     |
| Propagation Delay<br>Strobe In to Data Out | TPHL1<br>TPLH1 | VDD = 10V                     | 1, 2, 3 | +25°C                   | -      | 140   | ns    |
|  |                | VDD = 15V                     | 1, 2, 3 | +25°C                   | -      | 100   | ns    |

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

| PARAMETER                                | SYMBOL         | CONDITIONS | NOTES   | TEMPERATURE | LIMITS |     | UNITS |
|--|----------------|------------|---------|-------------|--------|-----|-------|
|  |                |            |         |             | MIN    | MAX |       |
| Propagation Delay<br>Data In to Data Out | TPHL2<br>TPLH2 | VDD = 5V   | 1, 2, 3 | +25°C       | -      | 210 | ns    |
|  |                | VDD = 10V  | 1, 2, 3 | +25°C       | -      | 120 | ns    |
|  |                | VDD = 15V  | 1, 2, 3 | +25°C       | -      | 90  | ns    |
| Propagation Delay<br>Reset to Data Out   | TPHL3<br>TPLH3 | VDD = 5V   | 1, 2, 3 | +25°C       | -      | 180 | ns    |
|  |                | VDD = 10V  | 1, 2, 3 | +25°C       | -      | 100 | ns    |
|  |                | VDD = 15V  | 1, 2, 3 | +25°C       | -      | 80  | ns    |
| Propagation Delay<br>3-State             | TPHZ<br>TPZH   | VDD = 5V   | 1, 2, 4 | +25°C       | -      | 180 | ns    |
|  |                | VDD = 10V  | 1, 2, 4 | +25°C       | -      | 100 | ns    |
|  |                | VDD = 15V  | 1, 2, 4 | +25°C       | -      | 70  | ns    |
| Transition Time<br>3-State               | TPLZ<br>TPZL   | VDD = 5V   | 1, 2, 4 | +25°C       | -      | 180 | ns    |
|  |                | 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 Strobe Pulse<br>Width            | TWS            | VDD = 5V   | 1, 2, 3 | +25°C       | -      | 140 | ns    |
|  |                | VDD = 10V  | 1, 2, 3 | +25°C       | -      | 80  | ns    |
|  |                | VDD = 15V  | 1, 2, 3 | +25°C       | -      | 70  | ns    |
| Minimum Data Setup<br>Time               | TS             | VDD = 5V   | 1, 2, 3 | +25°C       | -      | 50  | ns    |
|  |                | VDD = 10V  | 1, 2, 3 | +25°C       | -      | 30  | ns    |
|  |                | VDD = 15V  | 1, 2, 3 | +25°C       | -      | 20  | ns    |
| Minimum Data Hold Time                   | TH             | VDD = 5V   | 1, 2, 3 | +25°C       | -      | 0   | ns    |
|  |                | VDD = 10V  | 1, 2, 3 | +25°C       | -      | 0   | ns    |
|  |                | VDD = 15V  | 1, 2, 3 | +25°C       | -      | 0   | ns    |
| Minimum Reset Pulse<br>Width             | TWR            | VDD = 5V   | 1, 2, 3 | +25°C       | -      | 200 | ns    |
|  |                | VDD = 10V  | 1, 2, 3 | +25°C       | -      | 140 | ns    |
|  |                | VDD = 15V  | 1, 2, 3 | +25°C       | -      | 100 | 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       | -      | 25   | μA    |
| N Threshold Voltage | VNTH   | VDD = 10V, ISS = -10μA      | 1, 4  | +25°C       | -2.8   | -0.2 | V     |

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

| PARAMETER                 | SYMBOL          | CONDITIONS                   | NOTES      | TEMPERATURE | LIMITS      |                    | UNITS |
|---------------------------|-----------------|------------------------------|------------|-------------|-------------|--------------------|-------|
|                           |                 |                              |            |             | MIN         | MAX                |       |
| N Threshold Voltage Delta | $\Delta V_{TN}$ | VDD = 10V, ISS = -10 $\mu$ A | 1, 4       | +25°C       | -           | $\pm 1$            | V     |
| P Threshold Voltage       | VTP             | VSS = 0V, IDD = 10 $\mu$ A   | 1, 4       | +25°C       | 0.2         | 2.8                | V     |
| P Threshold Voltage Delta | $\Delta V_{TP}$ | VSS = 0V, IDD = 10 $\mu$ A   | 1, 4       | +25°C       | -           | $\pm 1$            | 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.

3. See Table 2 for +25°C limit.

2. CL = 50pF, RL = 200K, Input TR, TF < 20ns.

4. Read and Record

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

| PARAMETER               | SYMBOL | DELTA LIMIT                   |
|-------------------------|--------|-------------------------------|
| Supply Current - MSI-2  | IDD    | $\pm 1.0\mu$ A                |
| Output Current (Sink)   | IOL5   | $\pm 20\%$ x Pre-Test Reading |
| Output Current (Source) | IOH5A  | $\pm 20\%$ x Pre-Test Reading |

**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    |

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TABLE 8. BURN-IN AND IRRADIATION TEST CONNECTIONS

| FUNCTION                   | OPEN                           | GROUND                              | VDD                                      | 9V ± 0.5V                      | OSCILLATOR                     |       |
|----------------------------|--------------------------------|-------------------------------------|--|--------------------------------|--------------------------------|-------|
|                            |                                |                                     |  |                                | 50kHz                          | 25kHz |
| Static Burn-In 1<br>Note 1 | 5, 7, 9, 11, 17, 19,<br>21, 23 | 1-4, 6, 8, 10,<br>12-16, 18, 20, 22 | 24                                       |                                |                                |       |
| Static Burn-In 2<br>Note 1 | 5, 7, 9, 11, 17, 19,<br>21, 23 | 12                                  | 1-4, 6, 8, 10, 13-<br>16, 18, 20, 22, 24 |                                |                                |       |
| Dynamic Burn-In<br>Note 1  | -                              | 1, 3, 12, 13, 15                    | 2, 14, 24                                | 5, 7, 9, 11, 17, 19,<br>21, 23 | 4, 6, 8, 10, 16, 18,<br>20, 22 | -     |
| Irradiation<br>Note 2      | 5, 7, 9, 11, 17, 19,<br>21, 23 | 12                                  | 1-4, 6, 8, 10, 13-<br>16, 18, 20, 22, 24 |                                |                                |       |

NOTES:

- 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

Logic Diagram

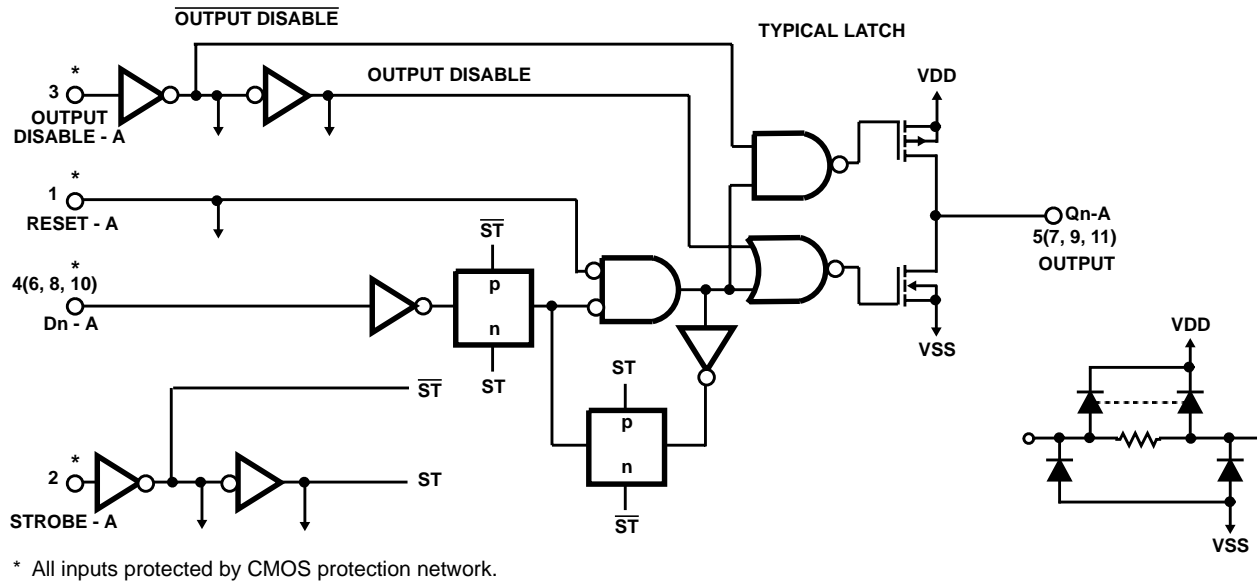


FIGURE 1. LOGIC DIAGRAM (A-SECTION), 1 OF 4 IDENTICAL LATCHES WITH COMMON OUTPUT DISABLE, RESET AND STROBE

TRUTH TABLE

| RESET | DISABLE | STROBE | D INPUT | Q OUTPUT |
|-------|---------|--------|---------|----------|
| 0     | 0       | 1      | 1       | 1        |
| 0     | 0       | 1      | 0       | 0        |
| 0     | 0       | 0      | X       | LATCHED  |
| 1     | 0       | X      | X       | 0        |
| X     | 1       | X      | X       | Z        |

1 = HIGH LEVEL  
0 = LOW LEVEL

X = DON'T CARE  
Z = HIGH IMPEDANCE

## Typical Performance Characteristics

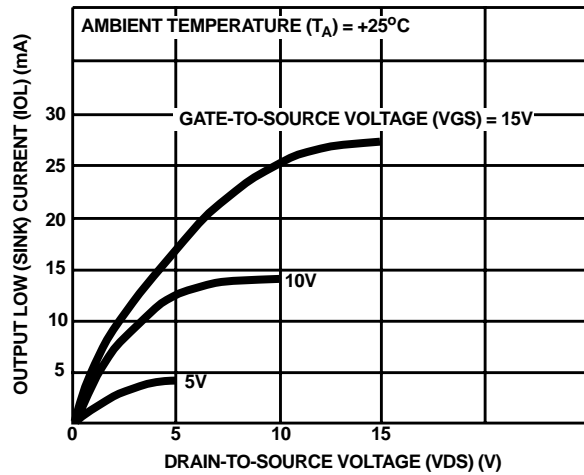


FIGURE 2. TYPICAL OUTPUT LOW (SINK) CURRENT CHARACTERISTICS

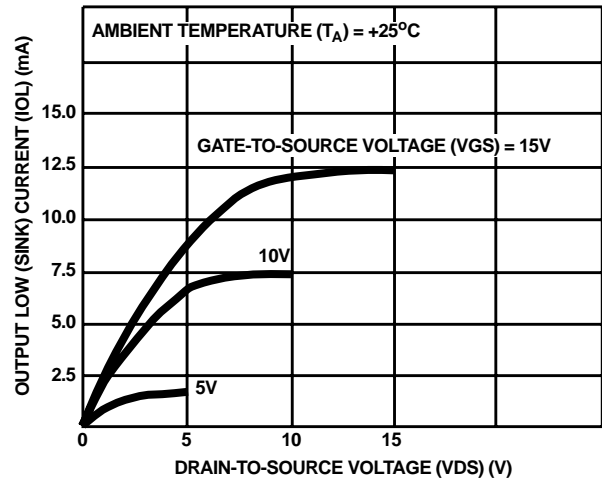


FIGURE 3. MINIMUM OUTPUT LOW (SINK) CURRENT CHARACTERISTICS

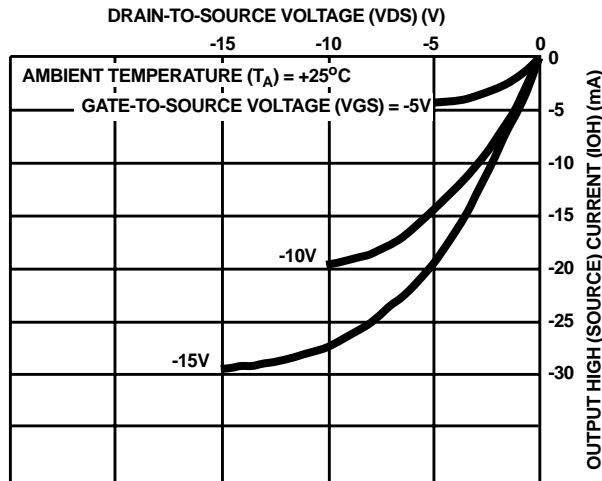


FIGURE 4. TYPICAL OUTPUT HIGH (SOURCE) CURRENT CHARACTERISTICS

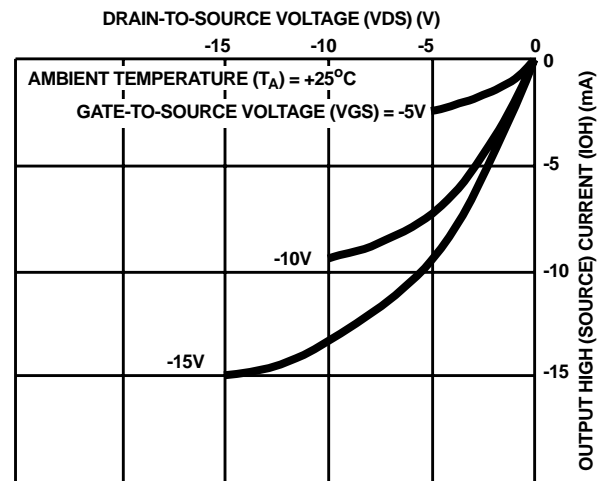


FIGURE 5. MINIMUM OUTPUT HIGH (SOURCE) CURRENT CHARACTERISTICS

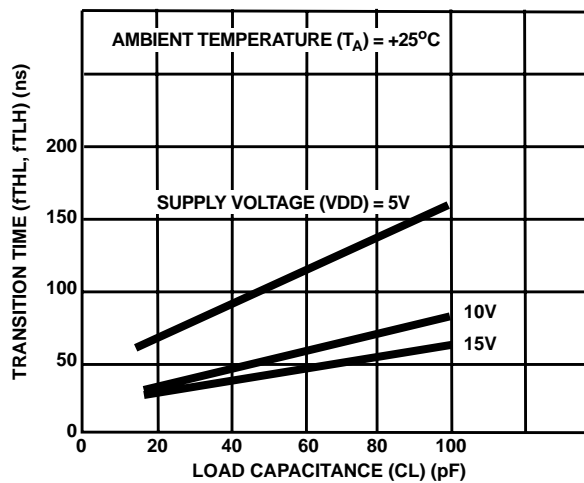


FIGURE 6. TYPICAL TRANSITION TIME AS A FUNCTION OF LOAD CAPACITANCE

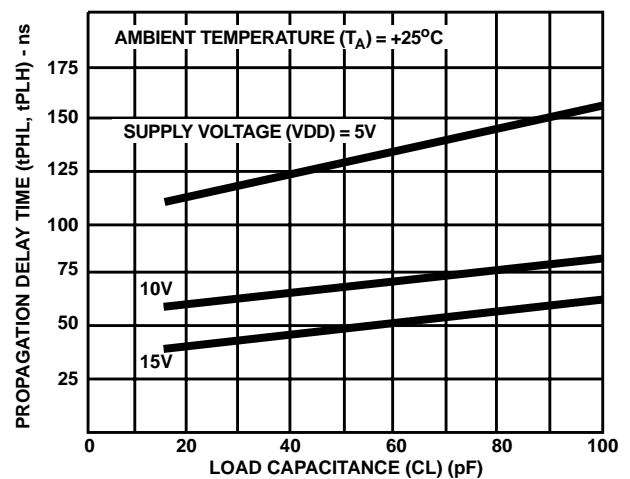


FIGURE 7. TYPICAL PROPAGATION DELAY TIME AS A FUNCTION OF LOAD CAPACITANCE (STROBE TO DATA OUT)

Typical Performance Characteristics (Continued)

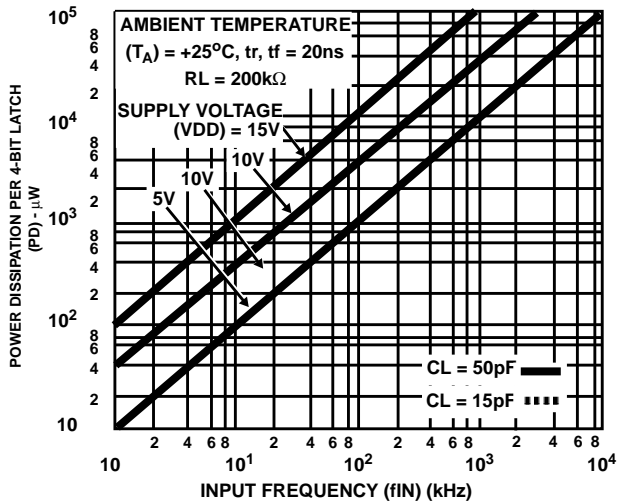


FIGURE 8. TYPICAL POWER DISSIPATION AS A FUNCTION OF FREQUENCY

Waveforms and Test Circuits

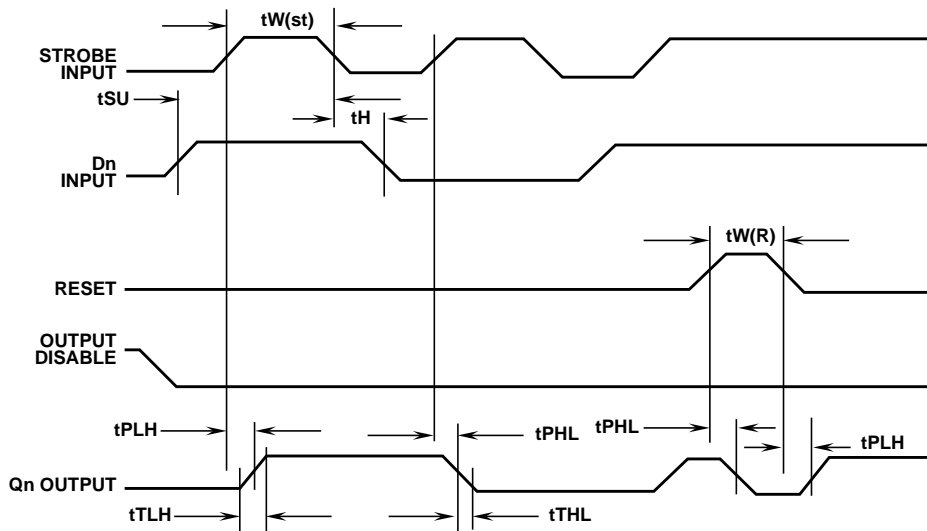


FIGURE 9. TEST WAVEFORMS

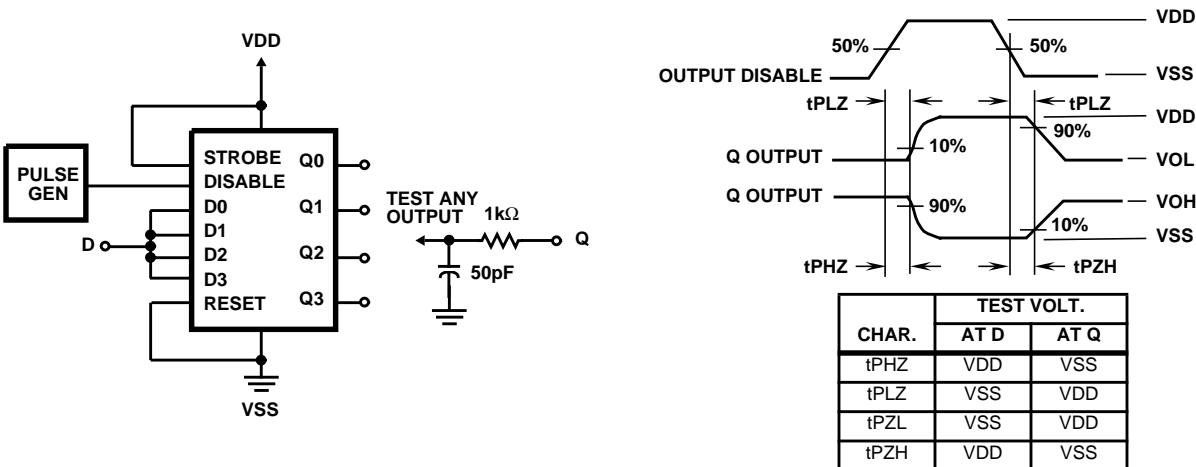


FIGURE 10. OUTPUT DISABLE TEST CIRCUIT AND WAVEFORMS



## Bus Registers

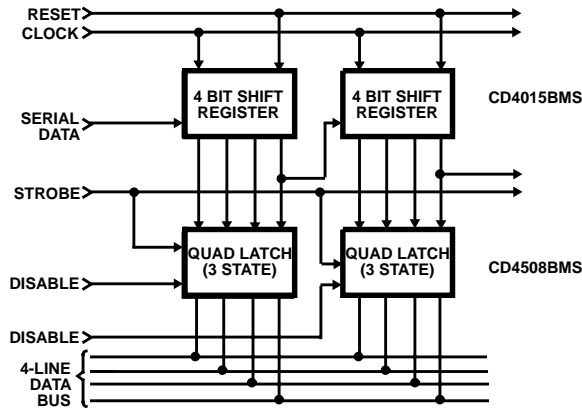


FIGURE 11. BUS REGISTER

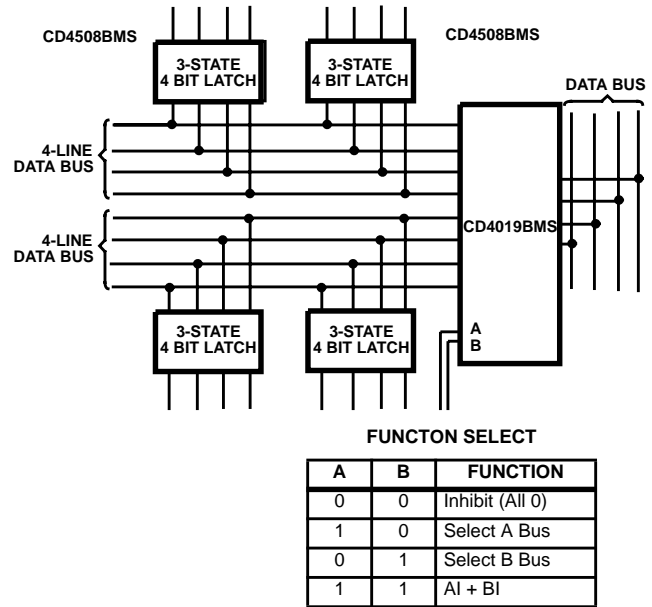
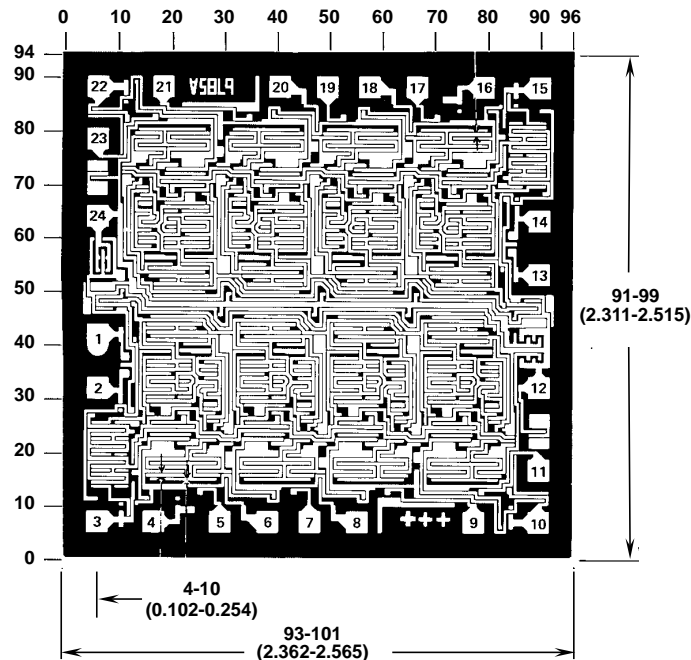


FIGURE 12. DUAL MULTIPLEXED BUS REGISTER WITH FUNCTION SELECT

## Chip Dimensions and Pad Layouts



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