

**MC14597B**  
**MC14598B**

**8-Bit Bus-Compatible Latches**

The MC14597B and MC14598B are 8-bit latches, one addressed with an internal counter and the other addressed with an external binary address. The 8 latch-outputs are high drive, three-state and bus line compatible. The drive capability allows direct applications with MPU systems such as the Motorola 6800 family.

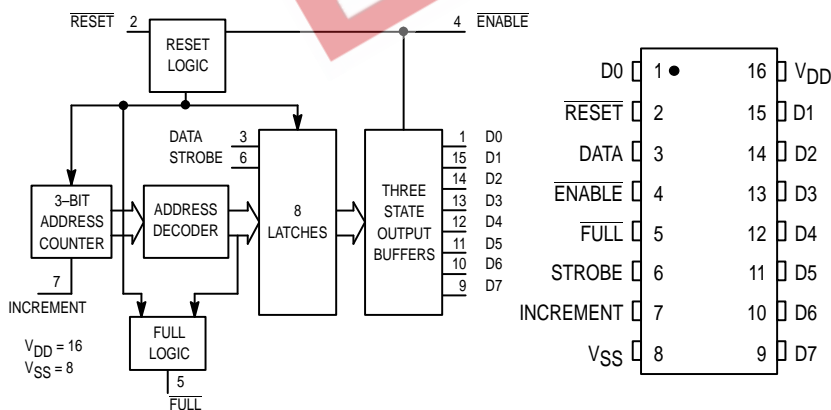
With MC14597B, a 3-bit address counter (clocked on the falling edge of Increment) selects the appropriate latch. The latches of the MC14598B are accessed via the Address pins, A0, A1, and A2. A Full Flag is provided on the MC14597B to indicate the position of the Address counter.

All 8 outputs from the latches are available in parallel when Enable is in the low state. Data is entered into a selected latch from the Data pin when the Strobe is high. Master reset is available on both parts.

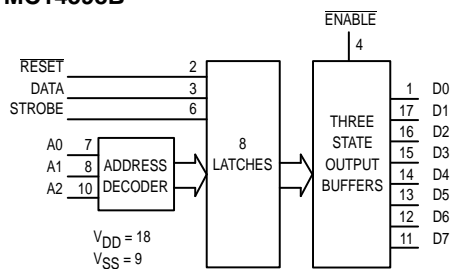
- Serial Data Input
- Three-State Bus Compatible Parallel Outputs
- Three-State Control Pin ( $\overline{\text{Enable}}$ ) TTL Compatible Input
- Open Drain Full Flag (Multiple Latch Wire-O Ring)
- Master Reset
- Level Shifting Inputs on All Except  $\overline{\text{Enable}}$
- Diode Protection — All Inputs
- Supply Voltage Range — 3.0 Vdc to 18 Vdc
- Capable of Driving TTL Over Rated Temperature Range  
With Fanout as Follows:  
1 TTL Load  
4 LSTTL Loads

**BLOCK DIAGRAMS**

**MC14597B**



**MC14598B**

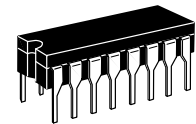


**OUTPUT TRUTH TABLE**

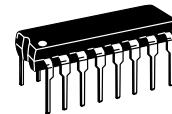
| Enable | Outputs        |
|--------|----------------|
| 1      | High Impedance |
| 0      | D <sub>n</sub> |

D<sub>n</sub> = State of nth latch

NC = NO CONNECTION



**L SUFFIX**  
CERAMIC  
CASE 620



**P SUFFIX**  
PLASTIC  
CASE 648

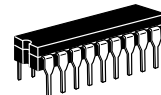


**D SUFFIX**  
SOIC  
CASE 751B

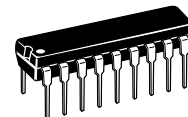
**ORDERING INFORMATION**

|            |         |
|------------|---------|
| MC14597BCP | Plastic |
| MC14597BCL | Ceramic |
| MC14597BDW | SOIC    |

T<sub>A</sub> = - 55° to 125°C for all packages.



**L SUFFIX**  
CERAMIC  
CASE 726

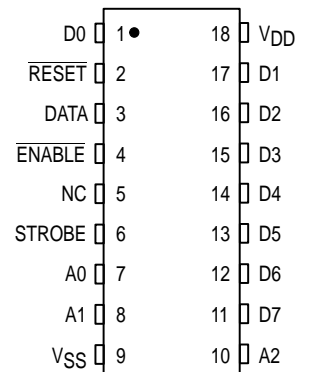


**P SUFFIX**  
PLASTIC  
CASE 707

**ORDERING INFORMATION**

|            |         |
|------------|---------|
| MC14598BCP | Plastic |
| MC14598BCL | Ceramic |

T<sub>A</sub> = - 55° to 125°C for all packages.



**MAXIMUM RATINGS\*** (Voltages Referenced to V<sub>SS</sub>)

| Symbol                | Parameter  | Value                          | Unit |
|-----------------------|--|--------------------------------|------|
| V <sub>DD</sub>       | DC Supply Voltage                                  | - 0.5 to + 18.0                | V    |
| V <sub>in</sub>       | Input Voltage, Enable (DC or Transient)            | - 0.5 to V <sub>DD</sub> + 0.5 | V    |
| V <sub>in</sub>       | Input Voltage, All other Inputs (DC or Transient)  | - 0.5 to V <sub>DD</sub> + 12  | V    |
| V <sub>out</sub>      | Output Voltage (DC or Transient)                   | - 0.5 to V <sub>DD</sub> + 0.5 | V    |
| I <sub>in, iout</sub> | Input or Output Current (DC or Transient), per Pin | ± 10                           | mA   |
| P <sub>D</sub>        | Power Dissipation, per Package†                    | 500                            | mW   |
| T <sub>stg</sub>      | Storage Temperature                                | - 65 to + 150                  | °C   |
| T <sub>L</sub>        | Lead Temperature (8-Second Soldering)              | 260                            | °C   |

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V<sub>in</sub> and V<sub>out</sub> should be constrained to the range V<sub>SS</sub> ≤ (V<sub>in</sub> or V<sub>out</sub>) ≤ V<sub>DD</sub>. Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V<sub>SS</sub> or V<sub>DD</sub>). Unused outputs must be left open.

\* Maximum Ratings are those values beyond which damage to the device may occur.

† Temperature Derating:

“P and D/DW” Packages: - 7.0 mW/°C From 65°C To 125°C Ceramic

“L” Packages: - 12 mW/°C From 100°C To 125°C

**ELECTRICAL CHARACTERISTICS** (Voltages Referenced to V<sub>SS</sub>)

| Characteristic  | Symbol                       | V <sub>DD</sub><br>Vdc | - 55°C  |      | 25°C  |          |      | 125°C |      | Unit |
|---|------------------------------|------------------------|---|------|-------|----------|------|-------|------|------|
|   |                              |                        | Min   | Max  | Min   | Typ #    | Max  | Min   | Max  |      |
| Output Voltage<br>V <sub>in</sub> = V <sub>DD</sub> or 0  | “0” Level<br>V <sub>OL</sub> | 5.0                    | —   | 0.05 | —     | 0        | 0.05 | —     | 0.05 | Vdc  |
|   |                              | 10                     | —   | 0.05 | —     | 0        | 0.05 | —     | 0.05 |      |
|   |                              | 15                     | —   | 0.05 | —     | 0        | 0.05 | —     | 0.05 |      |
| V <sub>in</sub> = 0 or V <sub>DD</sub>  | “1” Level<br>V <sub>OH</sub> | 5.0                    | 4.95  | —    | 4.95  | 5.0      | —    | 4.95  | —    | Vdc  |
|   |                              | 10                     | 9.95  | —    | 9.95  | 10       | —    | 9.95  | —    |      |
|   |                              | 15                     | 14.95   | —    | 14.95 | 15       | —    | 14.95 | —    |      |
| Input Voltage** — Enable<br>(V <sub>O</sub> = 4.5 or 0.5 Vdc)<br>(V <sub>O</sub> = 9.0 or 1.0 Vdc)<br>(V <sub>O</sub> = 13.5 or 1.5 Vdc)      | “0” Level<br>V <sub>IL</sub> | 5.0                    | —   | 0.8  | —     | 1.1      | 0.8  | —     | 0.8  | Vdc  |
|   |                              | 10                     | —   | 1.6  | —     | 2.2      | 1.6  | —     | 1.6  |      |
|   |                              | 15                     | —   | 2.4  | —     | 3.4      | 2.4  | —     | 2.4  |      |
|   | “1” Level<br>V <sub>IH</sub> | 5.0                    | 2.0   | —    | 2.0   | 1.9      | —    | 2.0   | —    | Vdc  |
|   |                              | 10                     | 6.0   | —    | 6.0   | 3.1      | —    | 6.0   | —    |      |
|   |                              | 15                     | 10  | —    | 10    | 4.3      | —    | 10    | —    |      |
| Input Voltage<br>Other Inputs<br>(V <sub>O</sub> = 4.5 or 0.5 Vdc)<br>(V <sub>O</sub> = 9.0 or 1.0 Vdc)<br>(V <sub>O</sub> = 13.5 or 1.5 Vdc) | “0” Level<br>V <sub>iL</sub> | 5.0                    | —   | 1.5  | —     | 2.25     | 1.5  | —     | 1.5  | Vdc  |
|   |                              | 10                     | —   | 3.0  | —     | 4.50     | 3.0  | —     | 3.0  |      |
|   |                              | 15                     | —   | 4.0  | —     | 6.75     | 4.0  | —     | 4.0  |      |
|   | “1” Level<br>V <sub>IH</sub> | 5.0                    | 3.5   | —    | 3.5   | 2.75     | —    | 3.5   | —    | Vdc  |
|   |                              | 10                     | 7.0   | —    | 7.0   | 5.50     | —    | 7.0   | —    |      |
|   |                              | 15                     | 11  | —    | 11    | 8.25     | —    | 11    | —    |      |
| Output Drive Current<br>(Full — Sink Only)<br>(V <sub>OH</sub> = 4.6 Vdc)<br>(V <sub>OH</sub> = 9.5 Vdc)<br>(V <sub>OH</sub> = 13.5 Vdc)      | Source<br>I <sub>OH</sub>    | 5.0                    | - 1.0   | —    | - 1.0 | - 2.0    | —    | - 1.0 | —    | mAdc |
|   |                              | 10                     | —   | —    | —     | - 6.0    | —    | —     | —    |      |
|   |                              | 15                     | —   | —    | —     | - 12     | —    | —     | —    |      |
|   | Sink<br>I <sub>OL</sub>      | 5.0                    | 1.6   | —    | 1.6   | 3.2      | —    | 1.6   | —    | mAdc |
|   |                              | 10                     | —   | —    | —     | 6.0      | —    | —     | —    |      |
|   |                              | 15                     | —   | —    | —     | 12       | —    | —     | —    |      |
| Input Current   | I <sub>in</sub>              | 15                     | —   | ±0.1 | —     | ±0.00001 | ±0.1 | —     | ±1.0 | μAdc |
| Three-State Leakage Current   | I <sub>TL</sub>              | 15                     | —   | ±0.1 | —     | ±0.00001 | ±0.1 | —     | ±3.0 | μAdc |
| Input Capacitance (V <sub>in</sub> = 0)   | C <sub>in</sub>              | —                      | —   | —    | —     | 5.0      | 7.5  | —     | —    | pF   |
| Quiescent Current<br>(Per Package)  | I <sub>DD</sub>              | 5.0                    | —   | 5.0  | —     | 0.005    | 5.0  | —     | 150  | μAdc |
|   |                              | 10                     | —   | 10   | —     | 0.010    | 10   | —     | 300  |      |
|   |                              | 15                     | —   | 20   | —     | 0.015    | 20   | —     | 600  |      |
| **Total Supply Current at an External Load Capacitance of 130 pF  | I <sub>T</sub>               | 5.0<br>10              | I <sub>T</sub> = (2.0 μA/kHz) f + I <sub>DD</sub><br>I <sub>T</sub> = (4.0 μA/kHz) f + I <sub>DD</sub><br>I <sub>T</sub> = (6.0 μA/kHz) f + I <sub>DD</sub> |      |       |          |      |       |      | μAdc |

† Data labelled “Typ” is not to be used for design purposes but is intended as an indication of the IC’s potential performance.

\*\*The formulas given are for the typical characteristics only at 25°C.

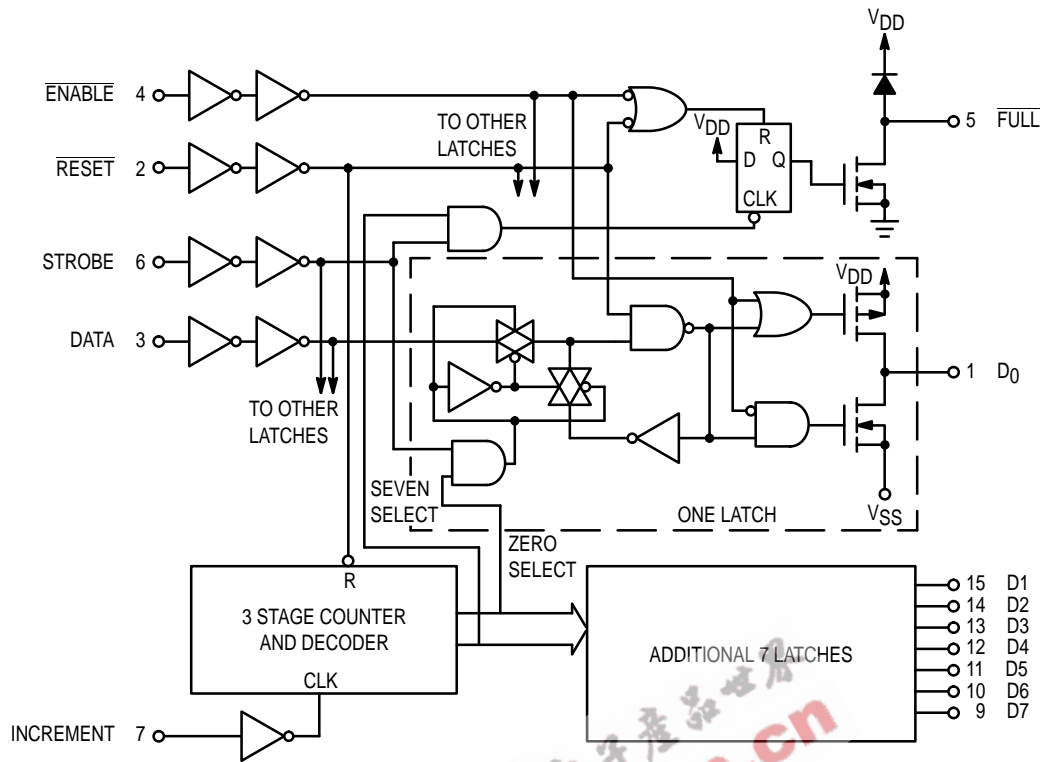
**SWITCHING CHARACTERISTICS\*** ( $T_A = 25^\circ\text{C}$ ,  $C_L = 130\text{ pF} + 1\text{ TTL Load}$ )

| Characteristic   | Symbol                  | VDD<br>Vdc   | All Types   |   |  | Unit |
|--|-------------------------|--|---|---|--|------|
|  |                         |  | Min   | Typ #   | Max  |      |
| Output Rise and Fall Time<br>$t_{TLH}, t_{THL} = (0.5\text{ ns/pF}) C_L + 35\text{ ns}$<br>$t_{TLH}, t_{THL} = (0.2\text{ ns/pF}) C_L + 25\text{ ns}$<br>$t_{TLH}, t_{THL} = (0.16\text{ ns/pF}) C_L + 20\text{ ns}$ | $t_{TLH},$<br>$t_{THL}$ | 5.0<br>10<br>15  | —<br>—<br>—   | 100<br>50<br>40   | 200<br>100<br>80   | ns   |
| Propagation Delay Time<br>Enable to Output<br><br>Strobe to Output<br><br>Strobe to $\overline{\text{Full}}$ (MC14597B only)<br><br>$\overline{\text{Reset}}$ to Output  | $t_{PLH},$<br>$t_{PHL}$ | 5.0<br>10<br>15<br><br>5.0<br>10<br>15<br><br>5.0<br>10<br>15                        | —<br>—<br>—<br><br>—<br>—<br>—<br><br>—<br>—<br>—                               | 160<br>125<br>100<br><br>200<br>100<br>80<br><br>200<br>100<br>70                       | 320<br>250<br>200<br><br>400<br>200<br>160<br><br>400<br>200<br>140  | ns   |
| Pulse Width<br>Enable<br><br>Strobe<br><br>Increment (MC14597B only)<br><br>$\overline{\text{Reset}}$  | $t_{WH},$<br>$t_{WL}$   | 5.0<br>10<br>15<br><br>5.0<br>10<br>15<br><br>5.0<br>10<br>15<br><br>5.0<br>10<br>15 | —<br>—<br>—<br><br>—<br>—<br>—<br><br>200<br>100<br>80<br><br>300<br>160<br>100 | 320<br>240<br>160<br><br>200<br>100<br>80<br><br>100<br>50<br>40<br><br>150<br>80<br>50 | —<br>—<br>—<br><br>—<br>—<br>—<br><br>—<br>—<br>—<br><br>—<br>—<br>— | ns   |
| Setup Time<br>Data<br><br>Address (MC14598B only)<br><br>Increment (MC14597B only)   | $t_{su}$                | 5.0<br>10<br>15<br><br>5.0<br>10<br>15<br><br>5.0<br>10<br>15                        | 100<br>50<br>35<br><br>200<br>100<br>70<br><br>400<br>200<br>170                | 50<br>25<br>20<br><br>100<br>50<br>35<br><br>200<br>100<br>85                           | —<br>—<br>—<br><br>—<br>—<br>—<br><br>—<br>—<br>—                    | ns   |
| Hold Time<br>Data<br><br>Address (MC14598B only)   | $t_h$                   | 5.0<br>10<br>15<br><br>5.0<br>10<br>15   | 100<br>50<br>35<br><br>100<br>50<br>35  | 50<br>25<br>20<br><br>50<br>25<br>20  | —<br>—<br>—<br><br>—<br>—<br>—                                       | ns   |
| $\overline{\text{Reset}}$ Removal Time   | $t_{rem}$               | 5.0<br>10<br>15  | 20<br>20<br>20  | – 25<br>– 15<br>– 10  | —<br>—<br>—  | ns   |

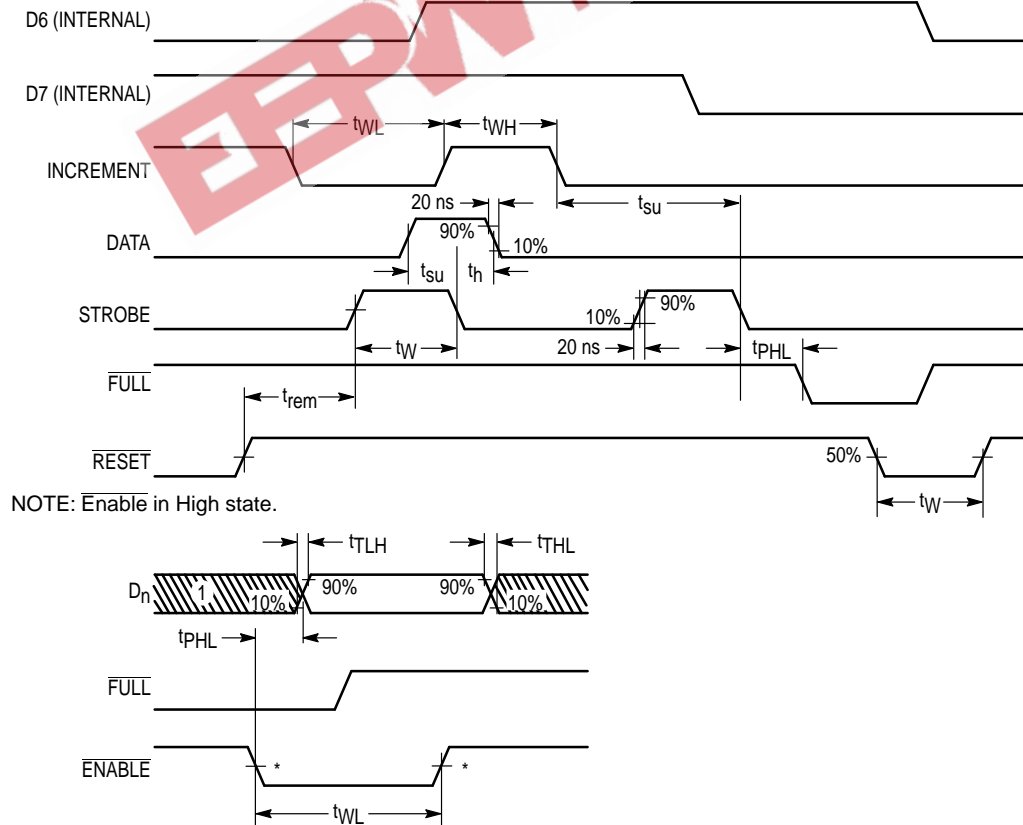
\* The formulas given are for the typical characteristics only at  $25^\circ\text{C}$ .

#Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

### MC14597B FUNCTION DIAGRAM



### MC14597B TIMING DIAGRAMS

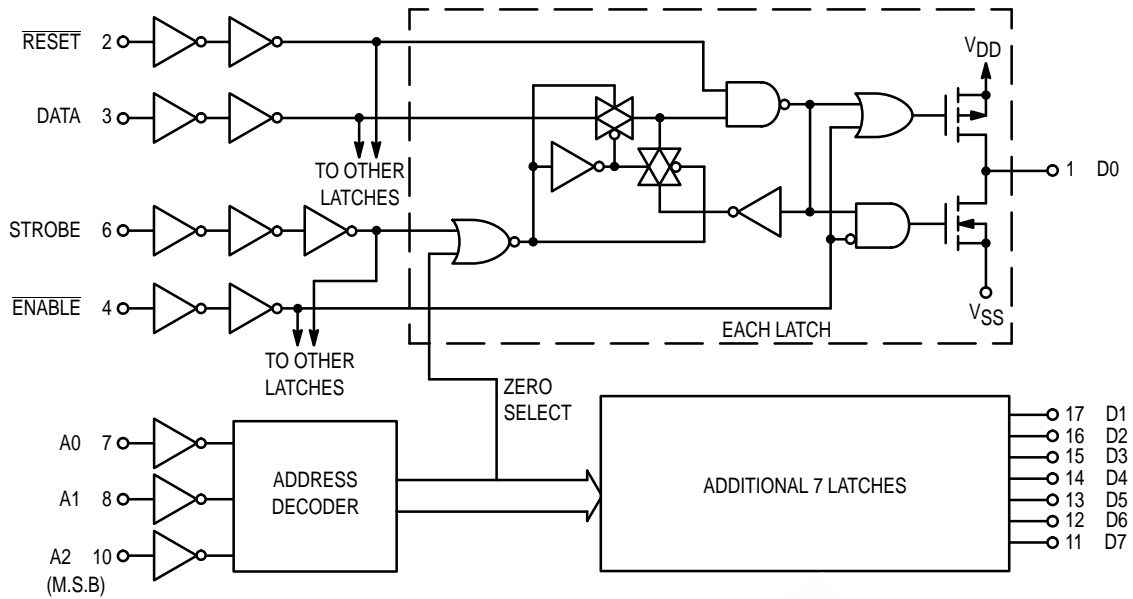


\* 1.4 V with  $V_{DD} = 5.0$  V

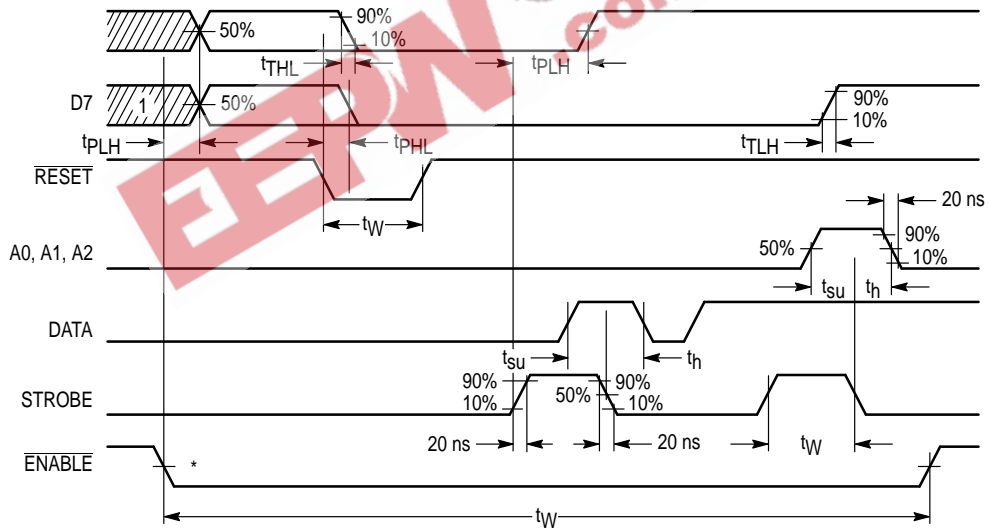
#### NOTES:

1. High-impedance output state (another device controls bus).
2. Reset in High state.

### MC14598B FUNCTION DIAGRAM



### MC14598B TIMING DIAGRAM



\* 1.4 V with  $V_{DD} = 5.0$  V

**NOTES:**

1. High-impedance output state (another device controls bus).
2. Output Load as for MC14597B.



**LATCH TRUTH TABLE**

| Strobe | $\overline{\text{Reset}}$ | Address Latch | Other Latches |
|--------|---------------------------|---------------|---------------|
| 0      | 1                         | *             | *             |
| 1      | 1                         | Data          | *             |
| X      | 0                         | 0             | 0             |

\* = No change in state of latch

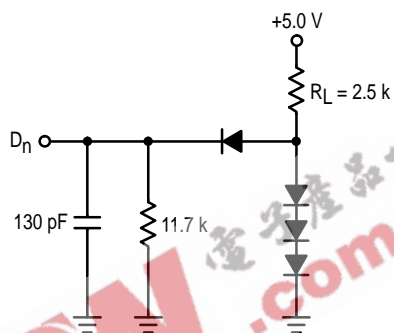
X = Don't care

**TRUTH TABLE FOR MC14597B**

| Increment   | $\overline{\text{Enable}}$ | $\overline{\text{Reset}}$ | Address Counter | $\overline{\text{Full}}$          |
|---|----------------------------|---------------------------|-----------------|-----------------------------------|
|  | X                          | 1                         | Count Up        | —                                 |
|  | X                          | 1                         | No Change       | —                                 |
| X   | 1                          | 0                         | Reset to Zero   | Set to One                        |
| X   | 0                          | 1                         | No Change       | Set to One                        |
| X   | 1                          | 1                         | If at ADDRESS 7 | To Zero on Falling Edge of STROBE |

X = Don't care

**TEST LOAD  
ALL OUTPUTS**



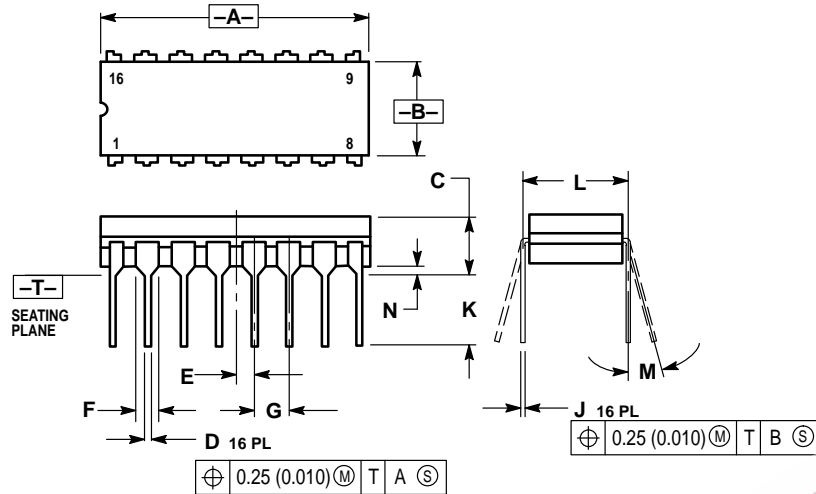
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## OUTLINE DIMENSIONS

### L SUFFIX CERAMIC DIP PACKAGE CASE 620-10 ISSUE V

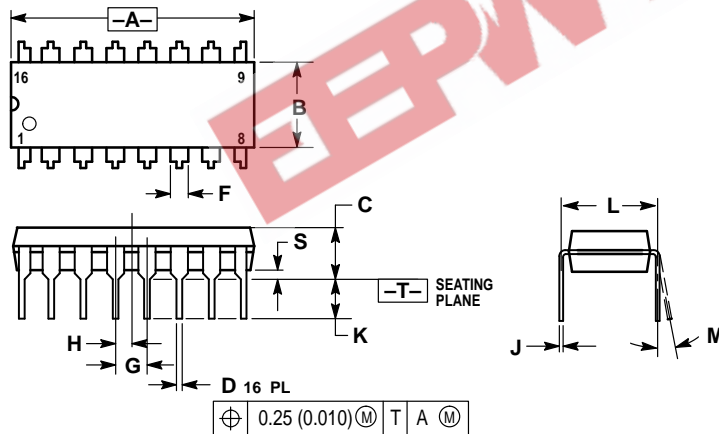


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.750     | 0.785 | 19.05       | 19.93 |
| B   | 0.240     | 0.295 | 6.10        | 7.49  |
| C   | —         | 0.200 | —           | 5.08  |
| D   | 0.015     | 0.020 | 0.39        | 0.50  |
| E   | 0.050 BSC |       | 1.27 BSC    |       |
| F   | 0.055     | 0.065 | 1.40        | 1.65  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.008     | 0.015 | 0.21        | 0.38  |
| K   | 0.125     | 0.170 | 3.18        | 4.31  |
| L   | 0.300 BSC |       | 7.62 BSC    |       |
| M   | 0°        | 15°   | 0°          | 15°   |
| N   | 0.020     | 0.040 | 0.51        | 1.01  |

### P SUFFIX PLASTIC DIP PACKAGE CASE 648-08 ISSUE R



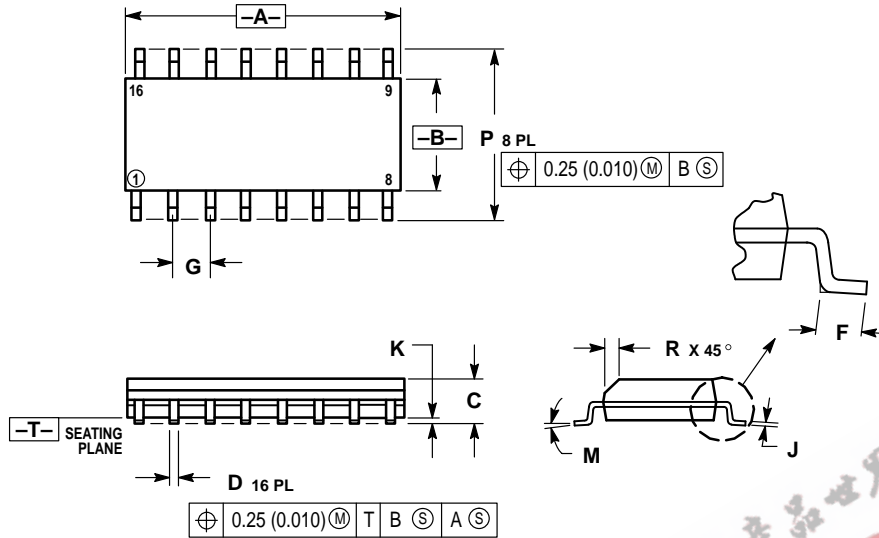
**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.740     | 0.770 | 18.80       | 19.55 |
| B   | 0.250     | 0.270 | 6.35        | 6.85  |
| C   | 0.145     | 0.175 | 3.69        | 4.44  |
| D   | 0.015     | 0.021 | 0.39        | 0.53  |
| F   | 0.040     | 0.70  | 1.02        | 1.77  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.050 BSC |       | 1.27 BSC    |       |
| J   | 0.008     | 0.015 | 0.21        | 0.38  |
| K   | 0.110     | 0.130 | 2.80        | 3.30  |
| L   | 0.295     | 0.305 | 7.50        | 7.74  |
| M   | 0°        | 10°   | 0°          | 10°   |
| S   | 0.020     | 0.040 | 0.51        | 1.01  |

## OUTLINE DIMENSIONS

### D SUFFIX PLASTIC SOIC PACKAGE CASE 751B-05 ISSUE J

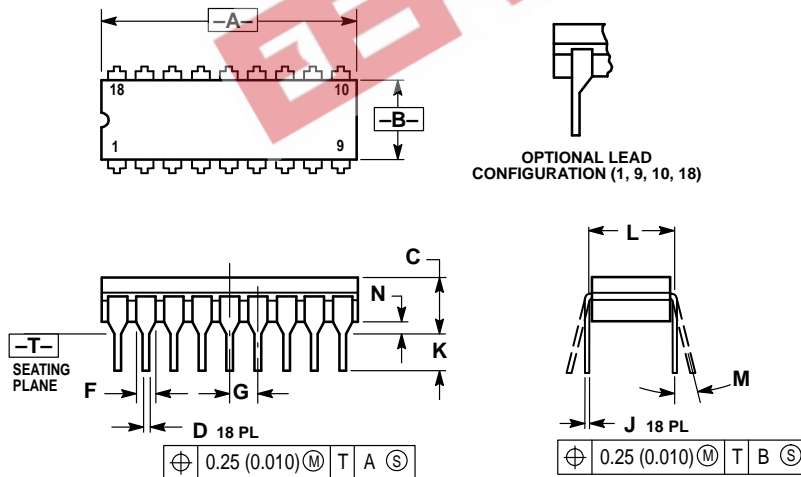


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 9.80        | 10.00 | 0.386     | 0.393 |
| B   | 3.80        | 4.00  | 0.150     | 0.157 |
| C   | 1.35        | 1.75  | 0.054     | 0.068 |
| D   | 0.35        | 0.49  | 0.014     | 0.019 |
| F   | 0.40        | 1.25  | 0.016     | 0.049 |
| G   | 1.27 BSC    |       | 0.050 BSC |       |
| J   | 0.19        | 0.25  | 0.008     | 0.009 |
| K   | 0.10        | 0.25  | 0.004     | 0.009 |
| M   | 0°          | 7°    | 0°        | 7°    |
| P   | 5.80        | 6.20  | 0.229     | 0.244 |
| R   | 0.25        | 0.50  | 0.010     | 0.019 |

### L SUFFIX CERAMIC DIP PACKAGE CASE 726-04 ISSUE G



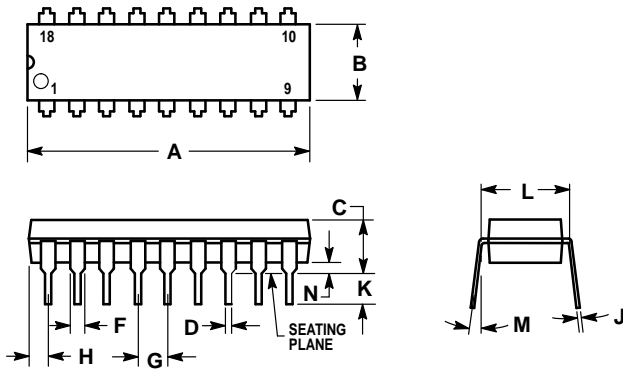
**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION F FOR FULL LEADS. HALF LEADS OPTIONAL AT LEAD POSITIONS 1, 9, 10, AND 18.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.880     | 0.910 | 22.35       | 23.11 |
| B   | 0.240     | 0.295 | 6.10        | 7.49  |
| C   | —         | 0.200 | —           | 5.08  |
| D   | 0.015     | 0.021 | 0.38        | 0.53  |
| F   | 0.055     | 0.070 | 1.40        | 1.78  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| J   | 0.008     | 0.012 | 0.20        | 0.30  |
| K   | 0.125     | 0.170 | 3.18        | 4.32  |
| L   | 0.300 BSC |       | 7.62 BSC    |       |
| M   | 0°        | 15°   | 0°          | 15°   |
| N   | 0.020     | 0.040 | 0.51        | 1.02  |



**P SUFFIX  
PLASTIC DIP PACKAGE  
CASE 707-02  
ISSUE C**



**NOTES:**

1. POSITIONAL TOLERANCE OF LEADS (D), SHALL BE WITHIN 0.25 (0.010) AT MAXIMUM MATERIAL CONDITION, IN RELATION TO SEATING PLANE AND EACH OTHER.
2. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
3. DIMENSION B DOES NOT INCLUDE MOLD FLASH.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 22.22       | 23.24 | 0.875     | 0.915 |
| B   | 6.10        | 6.60  | 0.240     | 0.260 |
| C   | 3.56        | 4.57  | 0.140     | 0.180 |
| D   | 0.36        | 0.56  | 0.014     | 0.022 |
| F   | 1.27        | 1.78  | 0.050     | 0.070 |
| G   | 2.54 BSC    |       | 0.100 BSC |       |
| H   | 1.02        | 1.52  | 0.040     | 0.060 |
| J   | 0.20        | 0.30  | 0.008     | 0.012 |
| K   | 2.92        | 3.43  | 0.115     | 0.135 |
| L   | 7.62 BSC    |       | 0.300 BSC |       |
| M   | 0°          | 15°   | 0°        | 15°   |
| N   | 0.51        | 1.02  | 0.020     | 0.040 |



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**How to reach us:**

**USA/EUROPE/Locations Not Listed:** Motorola Literature Distribution;  
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447 or 602-303-5454

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,  
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-81-3521-8315

**MFAX:** RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609  
**INTERNET:** <http://Design-NET.com>

**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



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