

## 8-Bit Addressable Latches

The MC14099B and MC14599B are 8-bit addressable latches. Data is entered in serial form when the appropriate latch is addressed (via address pins A0, A1, A2) and write disable is in the low state. Chip enable must be high for writing into MC14599B. For the MC14599B the data pin is a bidirectional data port and for the MC14099B the input is a unidirectional write only port. The Write/Read line controls this port in the MC14599B.

The data is presented in parallel at the output of the eight latches independently of the state of Write Disable, Write/Read or Chip Enable.

A Master Reset capability is available on both parts.

- Serial Data Input
- Parallel Output
- Master Reset
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low-power TTL Loads or One Low-Power Schottky TTL Load over the Rated Temperature Range
- MC14099B pin for pin compatible with CD4099B

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

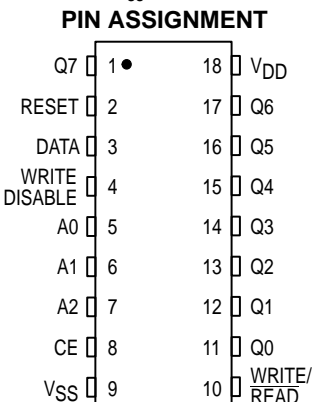
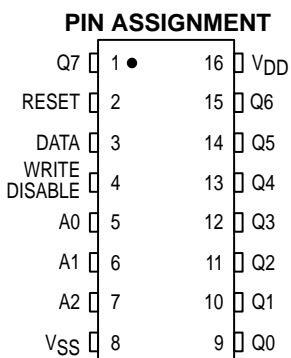
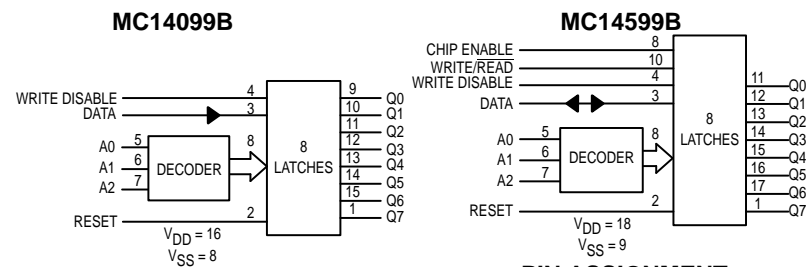
Symbol	Parameter	Value	Unit
V <sub>DD</sub>	DC Supply Voltage	- 0.5 to + 18.0	V
V <sub>in</sub> , V <sub>out</sub>	Input or Output Voltage (DC or Transient)	- 0.5 to V <sub>DD</sub> + 0.5	V
I <sub>in</sub> , I <sub>out</sub>	Input or Output Current (DC or Transient), per Pin	± 10	mA
P <sub>D</sub>	Power 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

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

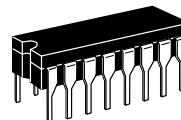
† Temperature Derating:

Plastic "P and D/DW" Packages: - 7.0 mW/°C From 65°C To 125°C

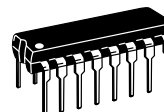
Ceramic "L" Packages: - 12 mW/°C From 100°C To 125°C



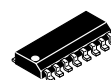
## MC14099B MC14599B



**L SUFFIX**  
CERAMIC  
CASE 620



**P SUFFIX**  
PLASTIC  
CASE 648

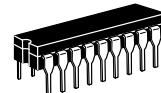


**DW SUFFIX**  
SOIC  
CASE 751G

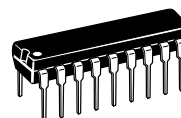
### ORDERING INFORMATION

MC14099BCP Plastic  
MC14099BCL Ceramic  
MC14099BDW SOIC

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



**L SUFFIX**  
CERAMIC  
CASE 726



**P SUFFIX**  
PLASTIC  
CASE 707

### ORDERING INFORMATION

MC14599BCP Plastic  
MC14599BCL Ceramic

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

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.

**ELECTRICAL CHARACTERISTICS** (Voltages Referenced to  $V_{SS}$ )

Characteristic	Symbol	$V_{DD}$ Vdc	- 55°C		25°C			125°C		Unit	
			Min	Max	Min	Typ #	Max	Min	Max		
Output Voltage $V_{in} = V_{DD}$ or 0  $V_{in} = 0$ or $V_{DD}$	"0" Level  $V_{OL}$	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		
	"1" Level  $V_{OH}$	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 "0" Level ( $V_O = 4.5$ or $0.5$ Vdc) ( $V_O = 9.0$ or $1.0$ Vdc) ( $V_O = 13.5$ or $1.5$ Vdc)  "1" Level ( $V_O = 0.5$ or $4.5$ Vdc) ( $V_O = 1.0$ or $9.0$ Vdc) ( $V_O = 1.5$ or $13.5$ Vdc)	$V_{IL}$	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		
	$V_{IH}$	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 Source ( $V_{OH} = 2.5$ Vdc) ( $V_{OH} = 4.6$ Vdc) ( $V_{OH} = 9.5$ Vdc) ( $V_{OH} = 13.5$ Vdc)  Sink ( $V_{OL} = 0.4$ Vdc) ( $V_{OL} = 0.5$ Vdc) ( $V_{OL} = 1.5$ Vdc)	$I_{OH}$	5.0	- 3.0	—	- 2.4	- 4.2	—	- 1.7	—	mAdc	
		5.0	- 0.64	—	- 0.51	- 0.88	—	- 0.36	—		
		10	- 1.6	—	- 1.3	- 2.25	—	- 0.9	—		
		15	- 4.2	—	- 3.4	- 8.8	—	- 2.4	—		
	$I_{OL}$	5.0	0.64	—	0.51	0.88	—	0.36	—	mAdc	
		10	1.6	—	1.3	2.25	—	0.9	—		
15		4.2	—	3.4	8.8	—	2.4	—			
Input Current	$I_{in}$	15	—	$\pm 0.1$	—	$\pm 0.00001$	$\pm 0.1$	—	$\pm 1.0$	$\mu$ Adc	
Input Capacitance ( $V_{in} = 0$ )	$C_{in}$	—	—	—	—	5.0	7.5	—	—	pF	
Input Capacitance MC14599B — Data (pin 3) ( $V_{in} = 0$ )	$C_{in}$	—	—	—	—	15	22.5	—	—	pF	
Quiescent Current (Per Package)	$I_{DD}$	5.0	—	5.0	—	0.005	5.0	—	150	$\mu$ Adc	
		10	—	10	—	0.010	10	—	300		
		15	—	20	—	0.015	20	—	600		
Total Supply Current**† (Dynamic plus Quiescent, Per Package) ( $C_L = 50$ pF on all outputs, all buffers switching)	$I_T$	5.0	$I_T = (1.5 \mu\text{A/kHz}) f + I_{DD}$ $I_T = (3.0 \mu\text{A/kHz}) f + I_{DD}$ $I_T = (4.5 \mu\text{A/kHz}) f + I_{DD}$							$\mu$ Adc	

#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.

†To calculate total supply current at loads other than 50 pF:

$$I_T(C_L) = I_T(50 \text{ pF}) + (C_L - 50) Vfk$$

where:  $I_T$  is in  $\mu\text{A}$  (per package),  $C_L$  in pF,  $V = (V_{DD} - V_{SS})$  in volts,  $f$  in kHz is input frequency, and  $k = 0.004$ .

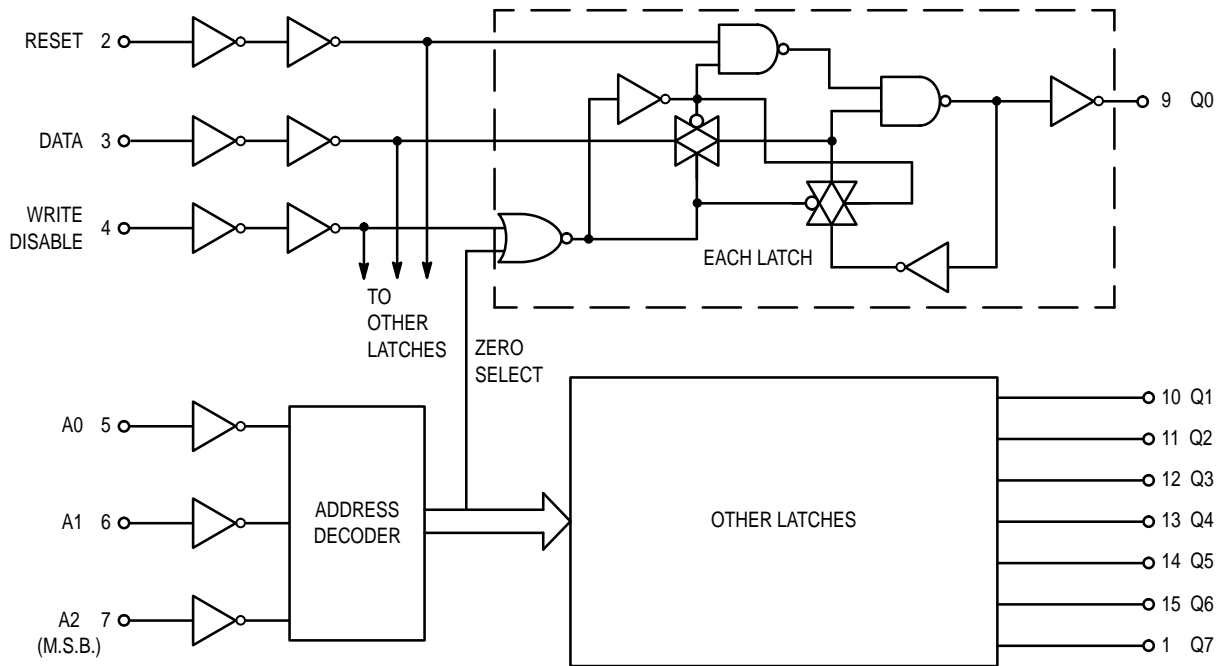
**SWITCHING CHARACTERISTICS\*** ( $C_L = 50 \text{ pF}$ ,  $T_A = 25^\circ\text{C}$ )

Characteristic	Symbol	V <sub>DD</sub> Vdc	Min	Typ #	Max	Unit
Output Rise and Fall Time t <sub>TLH</sub> , t <sub>THL</sub> = (1.35 ns/pF) C <sub>L</sub> + 32 ns t <sub>TLH</sub> , t <sub>THL</sub> = (0.6 ns/pF) C <sub>L</sub> + 20 ns t <sub>TLH</sub> , t <sub>THL</sub> = (0.4 ns/pF) C <sub>L</sub> + 20 ns	t <sub>TLH</sub> , t <sub>THL</sub>	5.0 10 15	— — —	100 50 40	200 100 80	ns
Propagation Delay Time Data to Output Q	t <sub>PHL</sub> , t <sub>PLH</sub>	5.0 10 15	— — —	200 75 50	400 150 100	ns
Write Disable to Output Q		5.0 10 15	— — —	200 80 60	400 160 120	ns
Reset to Output Q		5.0 10 15	— — —	175 80 65	350 160 130	ns
CE to Output Q (MC14599B only)		5.0 10 15	— — —	225 100 75	450 200 150	ns
Propagation Delay Time, MC14599B only Chip Enable, Write/Read to Data	t <sub>PHL</sub> , t <sub>PLH</sub>	5.0 10 15	— — —	200 80 65	400 160 130	ns
Address to Data		5.0 10 15	— — —	200 90 75	400 180 150	ns
Pulse Widths Reset	t <sub>w(H)</sub> t <sub>w(L)</sub>	5.0 10 15	150 75 50	75 40 25	— — —	ns
Write Disable		5.0 10 15	320 160 120	160 80 60	— — —	ns
Set Up Time Data to Write Disable	t <sub>su</sub>	5.0 10 15	100 50 35	50 25 20	— — —	ns
Hold Time Write Disable to Data	t <sub>h</sub>	5.0 10 15	150 75 50	75 40 25	— — —	ns
Set Up Time Address to Write Disable	t <sub>su</sub>	5.0 10 15	100 80 40	45 30 10	— — —	ns
Removal Time Write Disable to Address	t <sub>rem</sub>	5.0 10 15	0 0 0	- 80 - 40 - 40	— — —	ns

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

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

## MC14099B FUNCTION DIAGRAM



### TRUTH TABLE

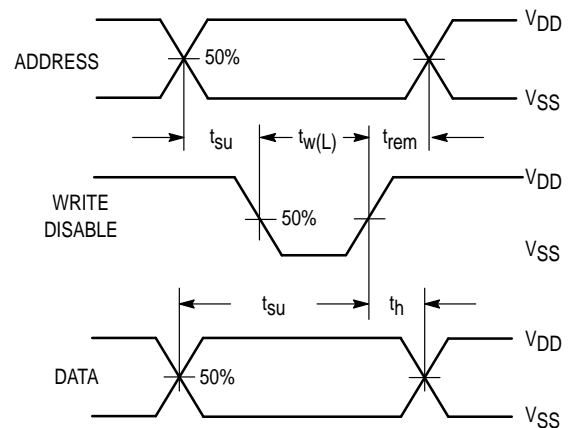
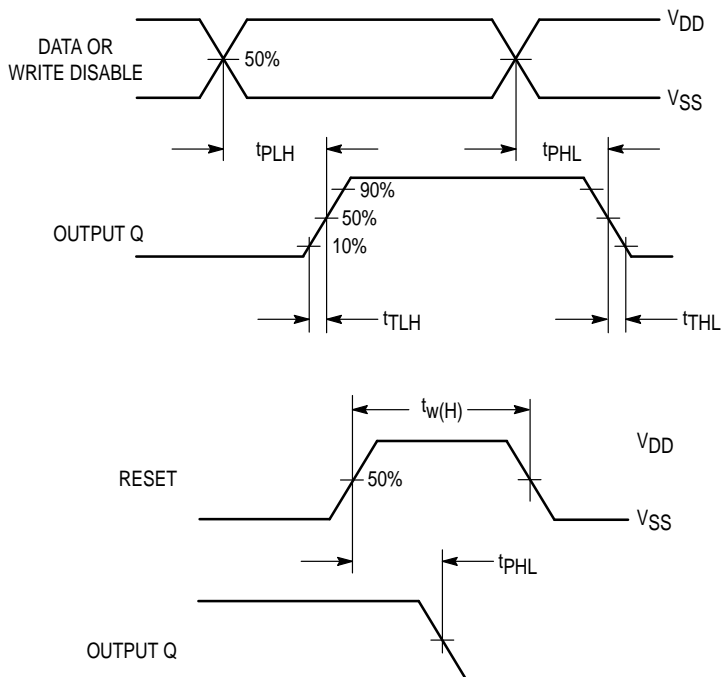
Write Disable	Reset	Addressed Latch	Unaddressed Latches
0	0	Data	$Q_n^*$
0	1	Data	Reset <sup>†</sup>
1	0	$Q_n^*$	$Q_n^*$
1	1	Reset	Reset

\*  $Q_n$  is previous state of latch.

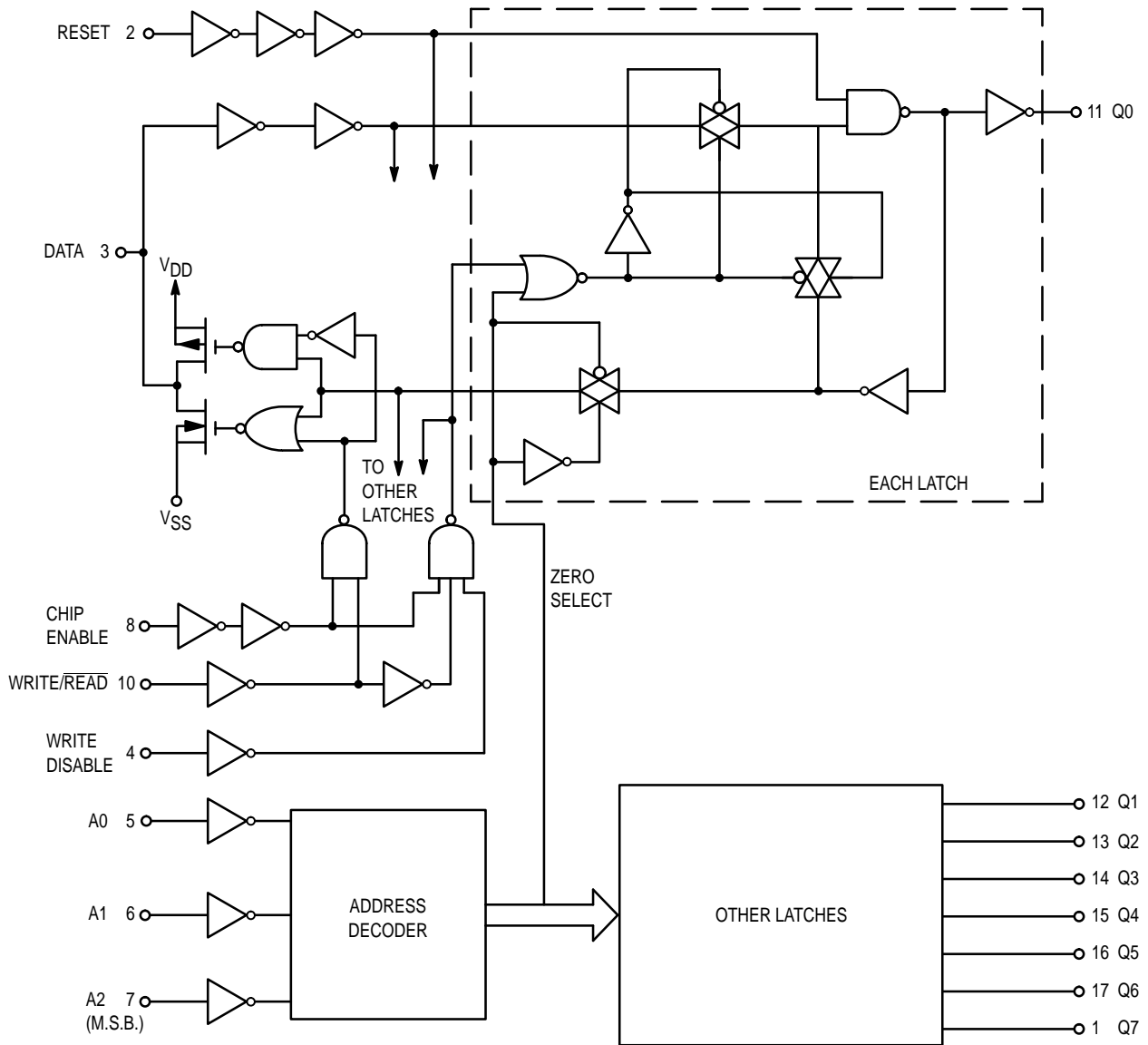
† Reset to zero state.

**CAUTION:** To avoid unintentional data changes in the latches, Write Disable must be active (high) during transitions on the address inputs A0, A1, and A2.

### SWITCHING WAVEFORMS



**MC14599B  
FUNCTION DIAGRAM**



**TRUTH TABLE**

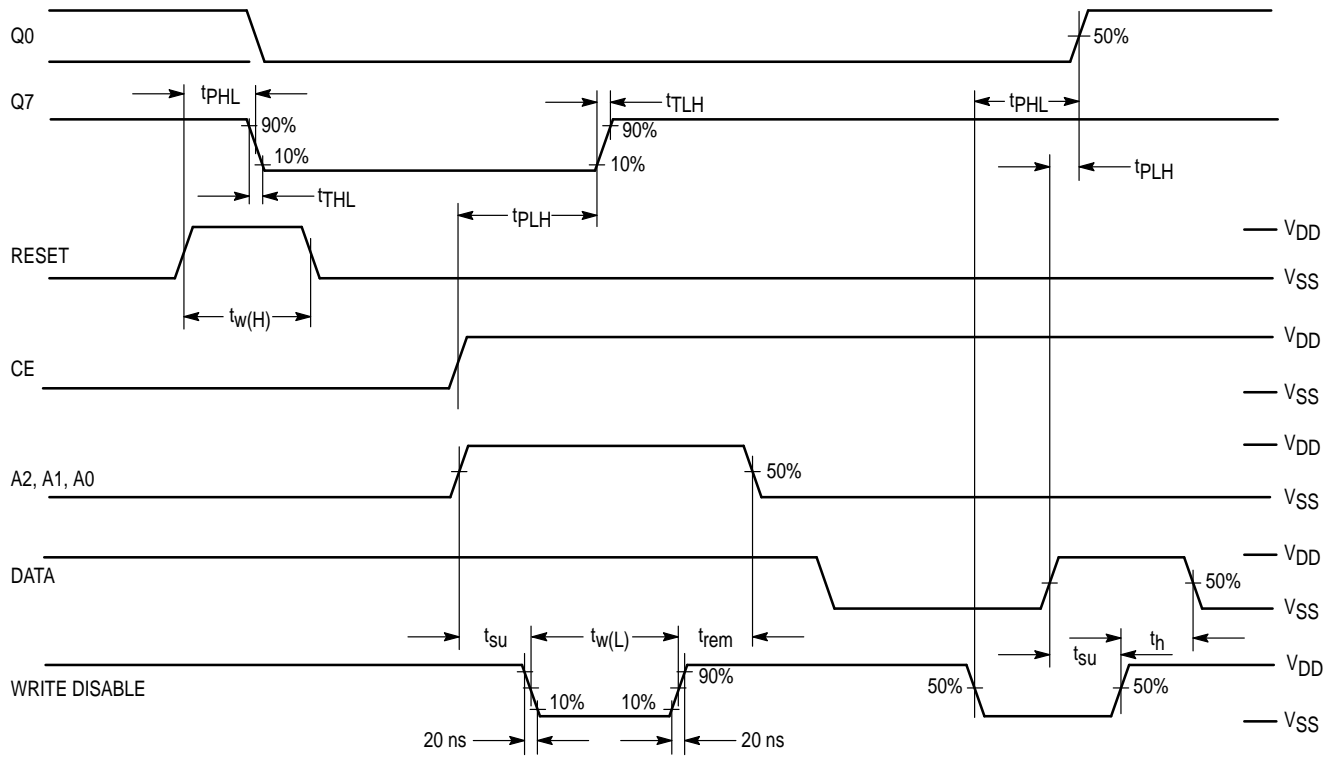
Chip Enable	Write/Read	Write Disable	Reset	Addressed Latch	Other Latches	Data Pin
0	X	X	0	*	*	Z
1	1	0	0	Data	*	Input
1	1	1	0	*	*	Z
1	0	X	0	*	*	Q <sub>n</sub>
X	X	X	1	0	0	Z/0

X = Don't care.  
 \* = No change in state of latch.  
 Z = High impedance.  
 Q<sub>n</sub> = State of addressed latch.

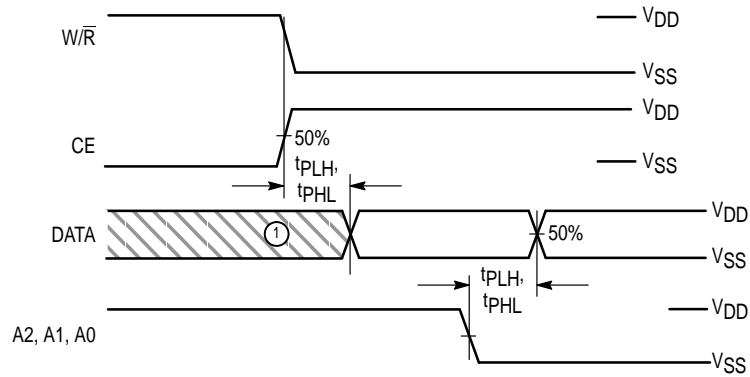
**CAUTION:** To avoid unintentional data changes in the latches, Write Disable must be active (high) during transitions on the address inputs A0, A1, and A2.

**MC14599B  
SWITCHING WAVEFORMS**

**DATA WRITE**



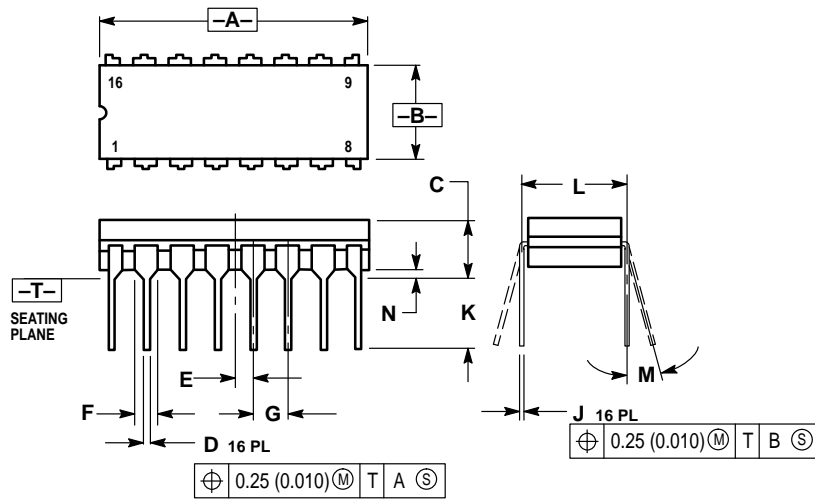
**DATA READ**



NOTE: 1. Invalid Data Output  
2. Reset in LOW State

## OUTLINE DIMENSIONS

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

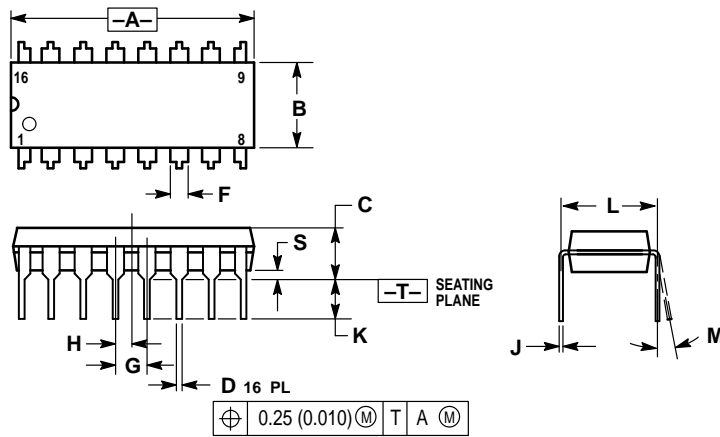


**NOTES:**

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



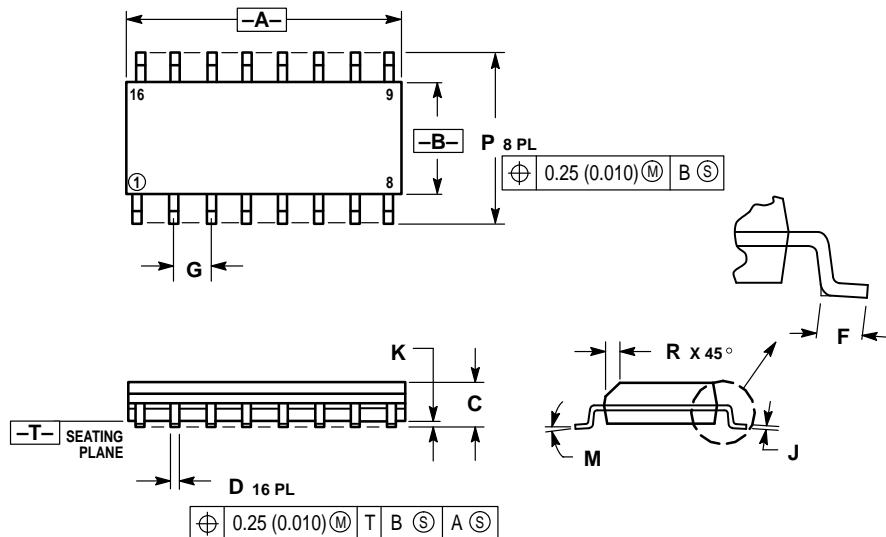
**NOTES:**

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

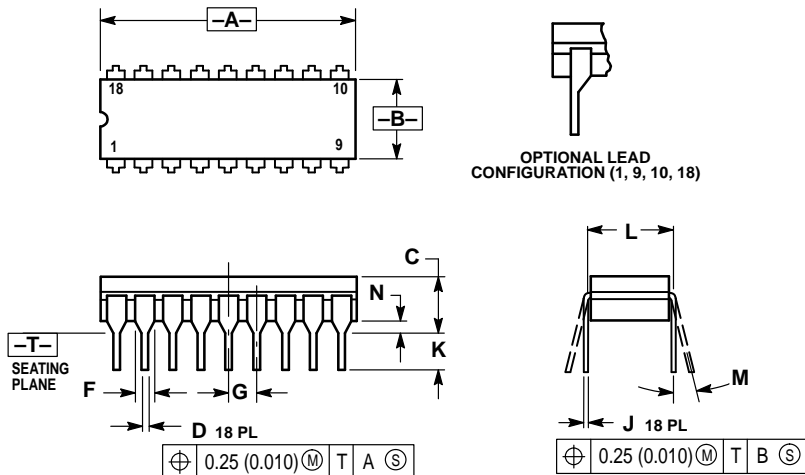
### D SUFFIX PLASTIC SOIC PACKAGE CASE 751B-05 ISSUE J



- 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

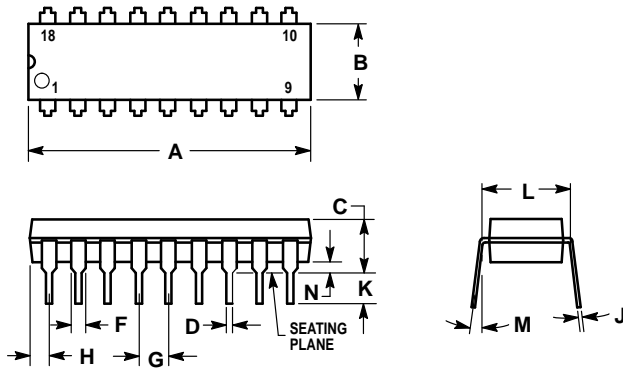


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
  4. DIMENSION F FOR FULL LEADS. HALF LEADS OPTIONAL AT LEAD POSITIONS 1, 9, 10, AND 18.

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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MC14099B/D

