



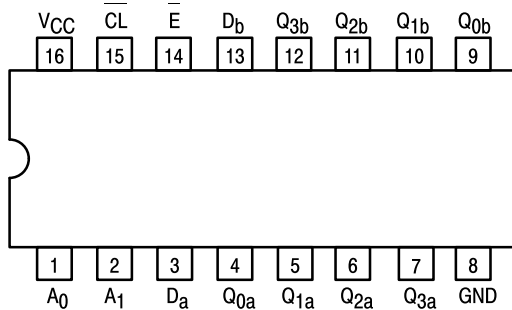
DUAL 4-BIT ADDRESSABLE LATCH

The SN54/74LS256 is a Dual 4-Bit Addressable Latch with common control inputs; these include two Address inputs (A_0, A_1), an active LOW Enable input (\bar{E}) and an active LOW Clear input (\bar{CL}). Each latch has a Data input (D) and four outputs (Q_0-Q_3).

When the Enable (\bar{E}) is HIGH and the Clear input (\bar{CL}) is LOW, all outputs (Q_0-Q_3) are LOW. Dual 4-channel demultiplexing occurs when the (\bar{CL}) and \bar{E} are both LOW. When \bar{CL} is HIGH and \bar{E} is LOW, the selected output (Q_0-Q_3), determined by the Address inputs, follows D . When the \bar{E} goes HIGH, the contents of the latch are stored. When operating in the addressable latch mode ($\bar{E}=\text{LOW}, \bar{CL}=\text{HIGH}$), changing more than one bit of the Address (A_0, A_1) could impose a transient wrong address. Therefore, this should be done only while in the memory mode ($\bar{E}=\bar{CL}=\text{HIGH}$).

- Serial-to-Parallel Capability
- Output From Each Storage Bit Available
- Random (Addressable) Data Entry
- Easily Expandable
- Active Low Common Clear
- Input Clamp Diodes Limit High Speed Termination Effects

CONNECTION DIAGRAM DIP (TOP VIEW)



NOTE:
The Flatpak version has the same pinouts (Connection Diagram) as the Dual In-Line Package.

PIN NAMES

- A_0, A_1 Address Inputs
- D_a, D_b Data Inputs
- \bar{E} Enable Input (Active LOW)
- \bar{CL} Clear Input (Active LOW)
- $Q_{0a}-Q_{3a}$ Parallel Latch Outputs (Note b)
- $Q_{0b}-Q_{3b}$ Parallel Latch Outputs (Note b)

NOTES:

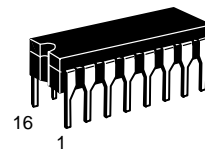
- a) 1 TTL Unit Load (U.L.) = 40 μA HIGH/1.6 mA LOW.
- b) The Output LOW drive factor is 2.5 U.L. for Military (54) and 5 U.L. for Commercial (74) Temperature Ranges.

LOADING (Note a)

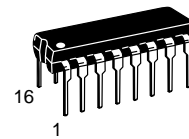
| | HIGH | LOW |
|-----------------|----------|--------------|
| A_0, A_1 | 0.5 U.L. | 0.25 U.L. |
| D_a, D_b | 0.5 U.L. | 0.25 U.L. |
| \bar{E} | 1.0 U.L. | 0.5 U.L. |
| \bar{CL} | 0.5 U.L. | 0.25 U.L. |
| $Q_{0a}-Q_{3a}$ | 10 U.L. | 5 (2.5) U.L. |

SN54/74LS256

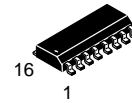
DUAL 4-BIT ADDRESSABLE LATCH LOW POWER SCHOTTKY



J SUFFIX
CERAMIC
CASE 620-09



N SUFFIX
PLASTIC
CASE 648-08

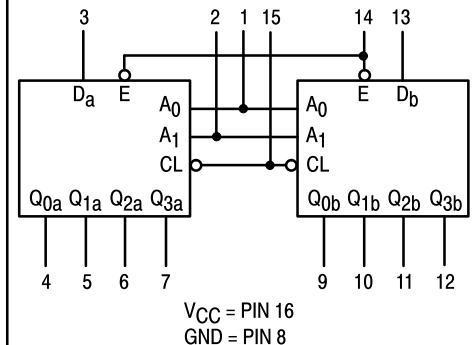


D SUFFIX
SOIC
CASE 751B-03

ORDERING INFORMATION

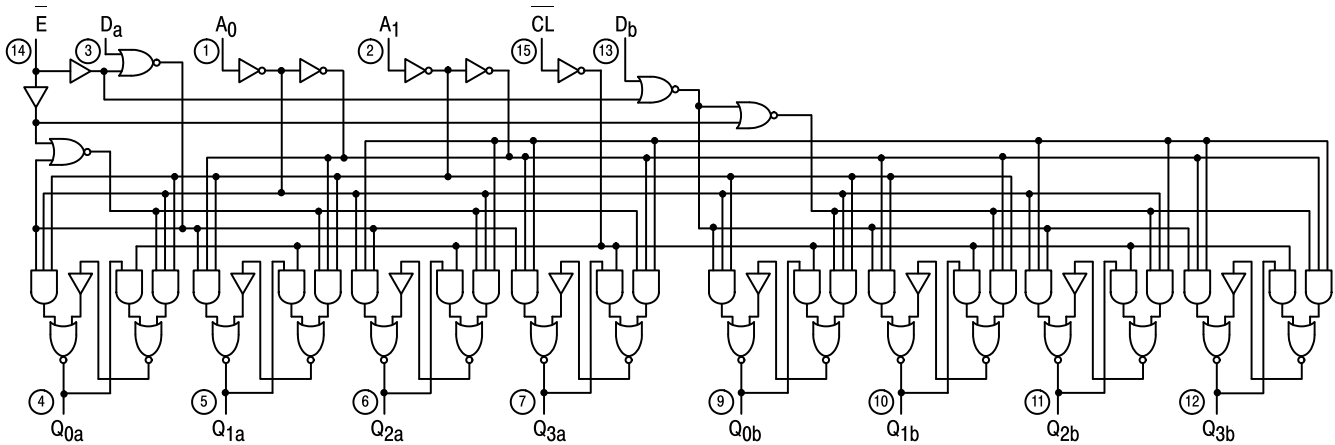
- SN54LSXXXJ Ceramic
- SN74LSXXXN Plastic
- SN74LSXXXD SOIC

LOGIC SYMBOL



SN54/74LS256

LOGIC DIAGRAM



V_{CC} = PIN 16
 GND = PIN 8
 ○ = PIN NUMBERS

TRUTH TABLE

| CL | E | D | A ₀ | A ₁ | Q ₀ | Q ₁ | Q ₂ | Q ₃ | MODE |
|----|---|---|----------------|----------------|------------------|------------------|------------------|------------------|-------------------|
| L | H | X | X | X | L | L | L | L | Clear |
| L | L | L | L | L | L | L | L | L | Demultiplex |
| L | L | H | L | L | H | L | L | L | |
| L | L | L | H | L | L | L | L | L | |
| L | L | H | H | L | L | H | L | L | |
| L | L | L | L | H | L | L | H | L | |
| L | L | L | H | H | L | L | L | L | |
| L | L | H | H | H | L | L | L | H | |
| H | H | X | X | X | Q _{N-1} | Q _{N-1} | Q _{N-1} | Q _{N-1} | Memory |
| H | L | L | L | L | L | Q _{N-1} | Q _{N-1} | Q _{N-1} | Addressable Latch |
| H | L | H | L | L | H | Q _{N-1} | Q _{N-1} | Q _{N-1} | |
| H | L | L | H | L | Q _{N-1} | L | Q _{N-1} | Q _{N-1} | |
| H | L | H | H | L | Q _{N-1} | H | Q _{N-1} | Q _{N-1} | |
| H | L | L | L | H | Q _{N-1} | Q _{N-1} | L | Q _{N-1} | |
| H | L | H | L | H | Q _{N-1} | Q _{N-1} | H | Q _{N-1} | |
| H | L | L | H | H | Q _{N-1} | Q _{N-1} | Q _{N-1} | L | |
| H | L | H | H | H | Q _{N-1} | Q _{N-1} | Q _{N-1} | H | |

H = HIGH Voltage Level
 L = LOW Voltage Level
 X = Immaterial

MODE SELECTION

| E | CL | MODE |
|---|----|------------------------------|
| L | H | Addressable Latch |
| H | H | Memory |
| L | L | Dual 4-Channel Demultiplexer |
| H | L | Clear |

SN54/74LS256

GUARANTEED OPERATING RANGES

| Symbol | Parameter | | Min | Typ | Max | Unit |
|-----------------|-------------------------------------|----------|-------------|------------|-------------|------|
| V _{CC} | Supply Voltage | 54 74 | 4.5 4.75 | 5.0 5.0 | 5.5 5.25 | V |
| T _A | Operating Ambient Temperature Range | 54 74 | -55 0 | 25 25 | 125 70 | °C |
| I _{OH} | Output Current — High | 54, 74 | | | -0.4 | mA |
| I _{OL} | Output Current — Low | 54 74 | | | 4.0 8.0 | mA |

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

| Symbol | Parameter | Limits | | | Unit | Test Conditions | |
|-----------------|---|--------|-------|--------------|------|--|--------------------------|
| | | Min | Typ | Max | | | |
| V _{IH} | Input HIGH Voltage | 2.0 | | | V | Guaranteed Input HIGH Voltage for All Inputs | |
| V _{IL} | Input LOW Voltage | 54 | | 0.7 | V | Guaranteed Input LOW Voltage for All Inputs | |
| | | 74 | | 0.8 | | | |
| V _{IK} | Input Clamp Diode Voltage | | -0.65 | -1.5 | V | V _{CC} = MIN, I _{IN} = -18 mA | |
| V _{OH} | Output HIGH Voltage | 54, 74 | 2.4 | 3.5 | V | V _{CC} = MIN, I _{OH} = MAX, V _{IN} = V _{IH} or V _{IL} per Truth Table | |
| V _{OL} | Output LOW Voltage | 54, 74 | | 0.25 | 0.4 | V | I _{OL} = 4.0 mA |
| | | 74 | | 0.35 | 0.5 | V | I _{OL} = 8.0 mA |
| I _{IH} | Input HIGH Current Others E Input | | | 20 40 | μA | V _{CC} = MAX, V _{IN} = 2.7 V | |
| | Others E Input | | | 0.1 0.2 | mA | V _{CC} = MAX, V _{IN} = 7.0 V | |
| I _{IL} | Input LOW Current Others E Input | | | -0.4 -0.8 | mA | V _{CC} = MAX, V _{IN} = 0.4 V | |
| I _{OS} | Short Circuit Current (Note 1) | -20 | | -100 | mA | V _{CC} = MAX | |
| I _{CC} | Power Supply Current | | | 30 | mA | V _{CC} = MAX | |

Note 1: Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS (T_A = 25°C)

| Symbol | Parameter | Limits | | | Unit | Test Conditions |
|--------------------------------------|---|--------|----------|----------|----------|-----------------|
| | | Min | Typ | Max | | |
| t _{PLH} t _{PHL} | Turn-Off Delay, Enable to Output Turn-On Delay, Enable to Output | | 20 16 | 27 24 | ns ns | Figure 1 |
| t _{PLH} t _{PHL} | Turn-Off Delay, Data to Output Turn-On Delay, Data to Output | | 20 13 | 30 20 | ns ns | Figure 2 |
| t _{PLH} t _{PHL} | Turn-Off Delay, Address to Output Turn-On Delay, Address to Output | | 20 14 | 30 24 | ns ns | Figure 3 |
| t _{PHL} | Turn-On Delay, Clear to Output | | 12 | 23 | ns | Figure 5 |

V_{CC} = 5.0 V,
C_L = 15 pF

SN54/74LS256

AC SET-UP REQUIREMENTS ($T_A = 25^\circ\text{C}$)

| Symbol | Parameter | Limits | | | Unit | Test Conditions |
|--------|--------------------|--------|-----|-----|------|--|
| | | Min | Typ | Max | | |
| t_s | Data Setup Time | 20 | | | ns | Figures 4 & 6 $V_{CC} = 5.0\text{ V}$ |
| t_s | Address Setup Time | 0 | | | ns | |
| t_h | Data Hold Time | 0 | | | ns | |
| t_h | Address Hold Time | 15 | | | ns | |
| t_W | Enable Pulse Width | 15 | | | ns | |

AC WAVEFORMS

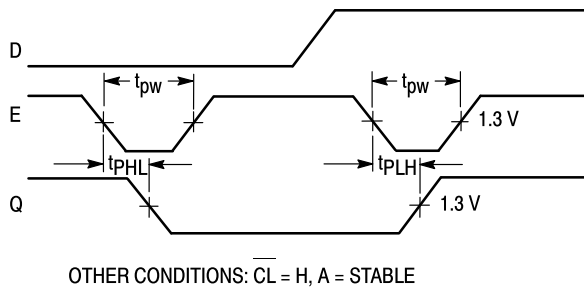


Figure 1. Turn-on and Turn-off Delays, Enable To Output and Enable Pulse Width

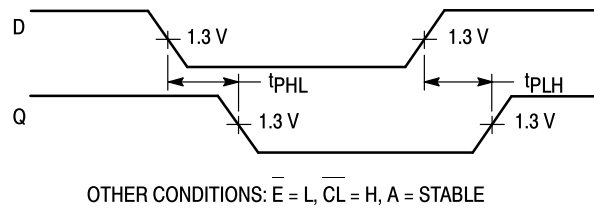


Figure 2. Turn-on and Turn-off Delays, Data to Output

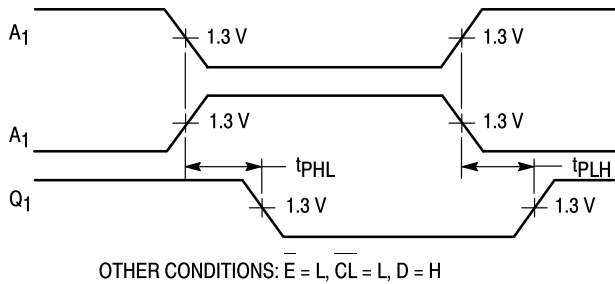


Figure 3. Turn-on and Turn-off Delays, Address to Output

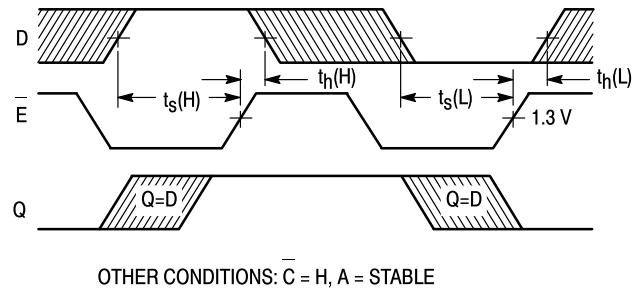


Figure 4. Setup and Hold Time, Data to Enable

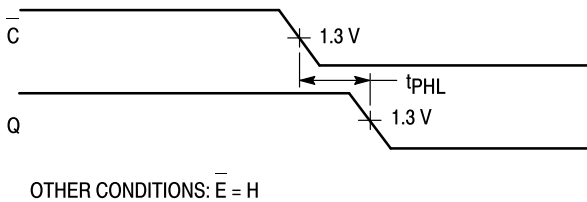


Figure 5. Turn-on Delay, Clear to Output

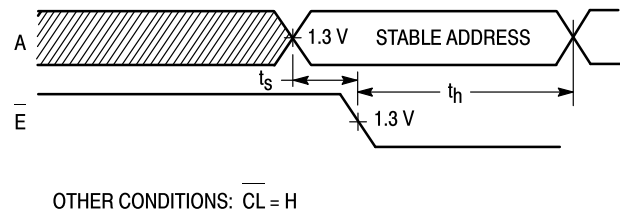
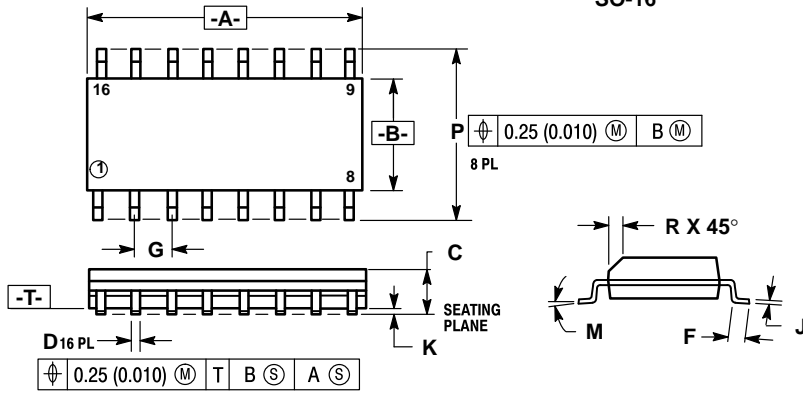


Figure 6. Setup Time, Address to Enable (See Notes 1 and 2)

NOTES:

1. The Address to Enable Setup Time is the time before the HIGH-to-LOW Enable transition that the Address must be stable so that the correct latch is addressed and the other latches are not affected.
2. The shaded areas indicate when the inputs are permitted to change for predictable output performance.

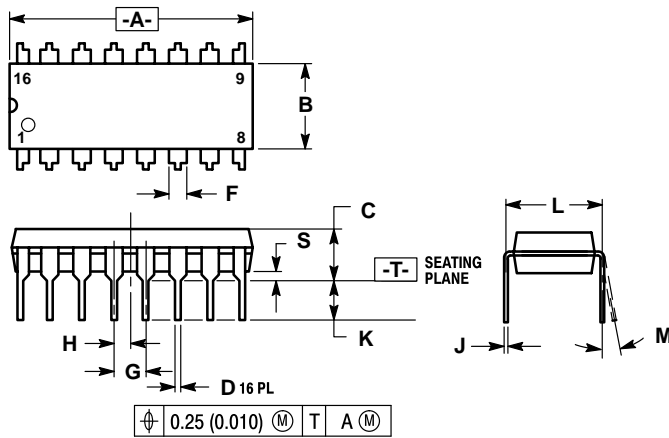
**Case 751B-03 D Suffix
16-Pin Plastic
SO-16**



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
 3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
 4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
 5. 751B-01 IS OBSOLETE, NEW STANDARD 751B-03.

| 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 |

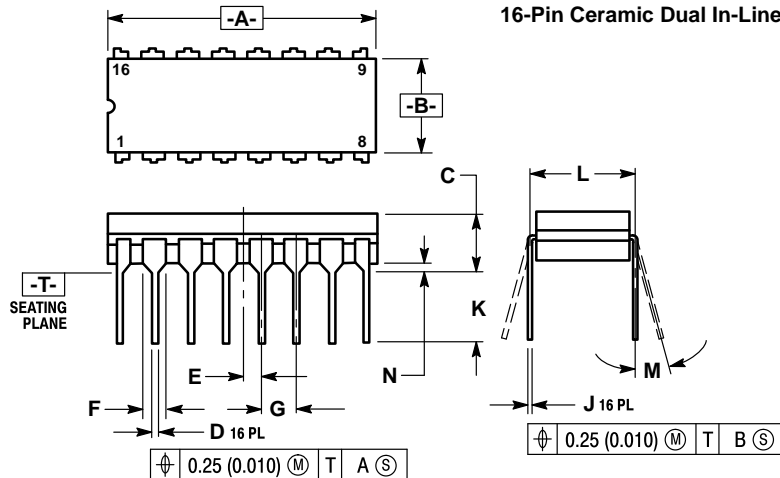
**Case 648-08 N Suffix
16-Pin Plastic**



- 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.
 6. 648-01 THRU -07 OBSOLETE, NEW STANDARD 648-08.


| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 18.80 | 19.55 | 0.740 | 0.770 |
| B | 6.35 | 6.85 | 0.250 | 0.270 |
| C | 3.69 | 4.44 | 0.145 | 0.175 |
| D | 0.39 | 0.53 | 0.015 | 0.021 |
| F | 1.02 | 1.77 | 0.040 | 0.070 |
| G | 2.54 BSC | | 0.100 BSC | |
| H | 1.27 BSC | | 0.050 BSC | |
| J | 0.21 | 0.38 | 0.008 | 0.015 |
| K | 2.80 | 3.30 | 0.110 | 0.130 |
| L | 7.50 | 7.74 | 0.295 | 0.305 |
| M | 0° | 10° | 0° | 10° |
| S | 0.51 | 1.01 | 0.020 | 0.040 |

**Case 620-09 J Suffix
16-Pin Ceramic Dual In-Line**



- 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. DIM F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.
 5. 620-01 THRU -08 OBSOLETE, NEW STANDARD 620-09.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 19.05 | 19.55 | 0.750 | 0.770 |
| B | 6.10 | 7.36 | 0.240 | 0.290 |
| C | — | 4.19 | — | 0.165 |
| D | 0.39 | 0.53 | 0.015 | 0.021 |
| E | 1.27 BSC | | 0.050 BSC | |
| F | 1.40 | 1.77 | 0.055 | 0.070 |
| G | 2.54 BSC | | 0.100 BSC | |
| J | 0.23 | 0.27 | 0.009 | 0.011 |
| K | — | 5.08 | — | 0.200 |
| L | 7.62 BSC | | 0.300 BSC | |
| M | 0° | 15° | 0° | 15° |
| N | 0.39 | 0.88 | 0.015 | 0.035 |

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