8-Bit Addressable Latch 1-of-8 Decoder

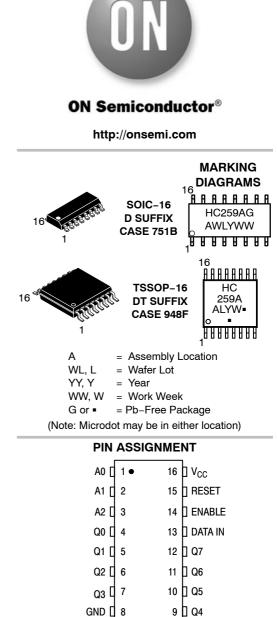
High-Performance Silicon-Gate CMOS

The MC74HC259A is identical in pinout to the LS259. The device inputs are compatible with standard CMOS outputs; with pullup resistors, they are compatible with LSTTL outputs.

The HC259A has four modes of operation as shown in the mode selection table. In the addressable latch mode, the data on Data In is written into the addressed latch. The addressed latch follows the data input with all non-addressed latches remaining in their previous states. In the memory mode, all latches remain in their previous state and are unaffected by the Data or Address inputs. In the one-of-eight decoding or demultiplexing mode, the addressed output follows the state of Data In with all other outputs in the LOW state. In the Reset mode all outputs are LOW and unaffected by the address and data inputs. When operating the HC259A as an addressable latch, changing more than one bit of the address could impose a transient wrong address. Therefore, this should only be done while in the memory mode.

Features

- Output Drive Capability: 10 LSTTL Loads
- Outputs Directly Interface to CMOS, NMOS, and TTL
- Operating Voltage Range: 2 to 6 V
- Low Input Current: 1 μA
- High Noise Immunity Characteristic of CMOS Devices
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant



MODE SELECTION TABLE

| Enable | Reset | Mode |
|--------|-------|----------------------|
| | ц | Addressable Latch |
| | | Memory |
| | | 8-Line Demultiplexer |
| | | Reset |
| н | L | Reset |

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

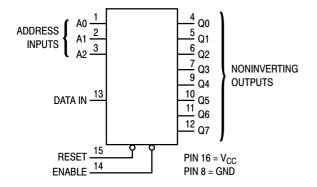


Figure 1. Logic Diagram

MAXIMUM RATINGS

Symbol Parameter Value Unit V_{CC} DC Supply Voltage (Referenced to GND) -0.5 to +7.0 V DC Input Voltage (Referenced to GND) V Vin -0.5 to V_{CC} + 0.5 -0.5 to V_{CC} + 0.5 Vout DC Output Voltage (Referenced to GND) ٧ DC Input Current, per Pin ±20 mΑ l_{in} DC Output Current, per Pin ±25 lout mΑ DC Supply Current, V_{CC} and GND Pins ±50 mΑ I_{CC} P_D Power Dissipation in Still Air, SOIC Package 500 mW TSSOP Package 450 T_{stg} Storage Temperature -65 to + 150 °C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | | | Max | Unit |
|------------------------------------|--|--|------------------|---------------------------|------|
| V _{CC} | DC Supply Voltage (Referenced to GND) | | | 6.0 | V |
| V _{in} , V _{out} | DC Input Voltage, Output Voltage (Referenced to GND) | | | V _{CC} | V |
| T _A | Operating Temperature, All Package Types | | | +125 | °C |
| t _r , t _f | (Figure 2) V _{CC} = V _{CC} = | = 2.0 V = 3.0 V = 4.5 V = 6.0 V | 0 0 0 0 | 1000 600 500 400 | ns |

LATCH SELECTION TABLE

| Address Inputs | | uts | |
|----------------|----------------|----------------|--|
| A ₂ | A ₁ | A ₀ | Latch Addressed |
| | | | Q0 Q1 Q2 Q3 Q4 Q5 Q6 |
| Н | Н | Н | Q7 |

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_{in} and V_{out} should be constrained to the range GND $\leq (V_{in} \text{ or } V_{out}) \leq V_{CC}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}). Unused outputs must be left open.

| | | | | Guaranteed Limit | | | |
|-----------------|---|--|--------------------------|----------------------------|----------------------------|----------------------------|------|
| Symbol | Parameter | Test Conditions | v _{cc} v | – 55 to 25°C | ≤ 85°C | ≤ 125°C | Unit |
| V _{IH} | Minimum High-Level Input Voltage | $\begin{array}{l} V_{out} = 0.1 \text{ V or } V_{CC} - 0.1 \text{ V} \\ \left I_{out}\right \leq 20 \; \mu\text{A} \end{array}$ | 2.0 3.0 4.5 6.0 | 1.5 2.1 3.15 4.2 | 1.5 2.1 3.15 4.2 | 1.5 2.1 3.15 4.2 | V |
| V _{IL} | Maximum Low-Level Input Voltage | $\begin{array}{l} V_{out} = 0.1 \text{ V or } V_{CC} - 0.1 \text{ V} \\ \left I_{out}\right \leq 20 \; \mu\text{A} \end{array}$ | 2.0 3.0 4.5 6.0 | 0.5 0.9 1.35 1.80 | 0.5 0.9 1.35 1.80 | 0.5 0.9 1.35 1.80 | V |
| V _{OH} | Minimum High-Level Output Voltage | | 2.0 4.5 6.0 | 1.9 4.4 5.9 | 1.9 4.4 5.9 | 1.9 4.4 5.9 | V |
| | | $\label{eq:Vin} \begin{array}{ll} V_{in} = V_{IH} \text{ or } V_{IL} & \left I_{out} \right \leq 2.4 \text{ mA} \\ \left I_{out} \right \leq 4.0 \text{ mA} \\ \left I_{out} \right \leq 5.2 \text{ mA} \end{array}$ | 3.0 4.5 6.0 | 2.48 3.98 5.48 | 2.34 3.84 5.34 | 2.20 3.70 5.20 | |
| V _{OL} | Maximum Low-Level Output Voltage | $V_{in} = V_{IH} \text{ or } V_{IL}$ $ I_{out} \le 20 \ \mu A$ | 2.0 4.5 6.0 | 0.1 0.1 0.1 | 0.1 0.1 0.1 | 0.1 0.1 0.1 | V |
| | | $ \begin{aligned} V_{in} = V_{IH} \text{ or } V_{IL} & \begin{array}{l} I_{out} \leq 2.4 \text{ mA} \\ I_{out} \leq 4.0 \text{ mA} \\ I_{out} \leq 5.2 \text{ mA} \end{aligned} $ | 3.0 4.5 6.0 | 0.26 0.26 0.26 | 0.33 0.33 0.33 | 0.40 0.40 0.40 | |
| l _{in} | Maximum Input Leakage Current | V _{in} = V _{CC} or GND | 6.0 | ± 0.1 | ± 1.0 | ± 1.0 | μA |
| I _{CC} | Maximum Quiescent Supply Current (per Package) | $V_{in} = V_{CC} \text{ or } GND$ $I_{out} = 0 \ \mu A$ | 6.0 | 4 | 40 | 160 | μA |

DC ELECTRICAL CHARACTERISTICS (Voltages Referenced to GND)

| Symbol | | | Guaranteed Limit | | | |
|--|--|--------------------------|-----------------------|-----------------------|-----------------------|------|
| | Parameter | V _{CC} V | - 55 to 25°C | ≤ 85 °C | ≤ 125°C | Unit |
| t _{PLH} , t _{PHL} | Maximum Propagation Delay, Data to Output (Figures 2 and 7) | 2.0 3.0 4.5 6.0 | 125 45 32 25 | 160 60 32 28 | 175 70 42 33 | ns |
| t _{PLH} , t _{PHL} | Maximum Propagation Delay, Address Select to Output (Figures 3 and 7) | 2.0 3.0 4.5 6.0 | 150 60 32 28 | 175 70 40 30 | 200 80 45 35 | ns |
| t _{PLH} , t _{PHL} | Maximum Propagation Delay, Enable to Output (Figures 4 and 7) | 2.0 3.0 4.5 6.0 | 150 60 32 28 | 175 70 40 30 | 200 80 45 35 | ns |
| t _{PHL} | Maximum Propagation Delay, Reset to Output (Figures 5 and 7) | 2.0 3.0 4.5 6.0 | 110 36 22 19 | 125 45 26 23 | 160 60 32 28 | ns |
| t _{TLH} , t _{THL} | Maximum Output Transition Time, Any Output (Figures 2 and 7) | 2.0 3.0 4.5 6.0 | 75 27 15 13 | 95 32 19 16 | 110 36 22 19 | ns |
| C _{in} | Maximum Input Capacitance | _ | 10 | 10 | 10 | pF |

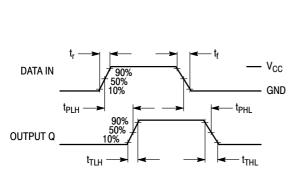
AC ELECTRICAL CHARACTERISTICS ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6 \text{ ns}$)

| | | Typical @ 25°C, V _{CC} = 5.0 V | |
|-----------------|---|---|----|
| C _{PD} | Power Dissipation Capacitance (Per Package) | 30 | pF |

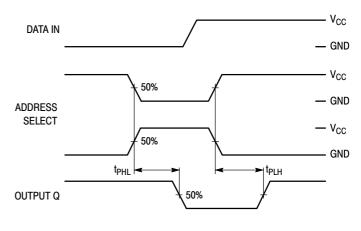
TIMING REQUIREMENTS (Input $t_r = t_f = 6 \text{ ns}$)

| | | | Guaranteed Limit | | mit | |
|---------------------------------|---|--------------------------|---------------------------|---------------------------|---------------------------|------|
| Symbol | Parameter | V _{CC} V | - 55 to 25°C | ≤ 85°C | ≤ 125°C | Unit |
| t _{su} | Minimum Setup Time, Address or Data to Enable (Figure 6) | 2.0 3.0 4.5 6.0 | 75 30 15 13 | 95 40 19 16 | 110 55 22 19 | ns |
| t _h | Minimum Hold Time, Enable to Address or Data (Figure 6) | 2.0 3.0 4.5 6.0 | 1 1 1 | 1 1 1 | 1 1 1 | ns |
| t _w | Minimum Pulse Width, Reset or Enable (Figure 4 or 5) | 2.0 3.0 4.5 6.0 | 70 27 15 13 | 90 32 19 16 | 100 36 22 19 | ns |
| t _r , t _f | Maximum Input Rise and Fall Times (Figure 2) | 2.0 3.0 4.5 6.0 | 1000 800 500 400 | 1000 800 500 400 | 1000 800 500 400 | ns |

SWITCHING WAVEFORMS









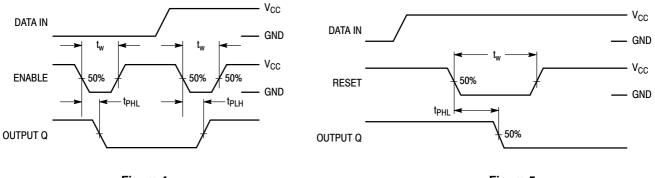
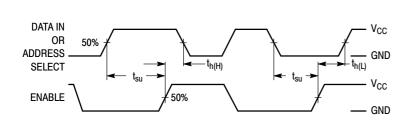
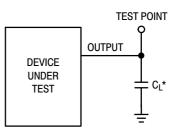


Figure 4.



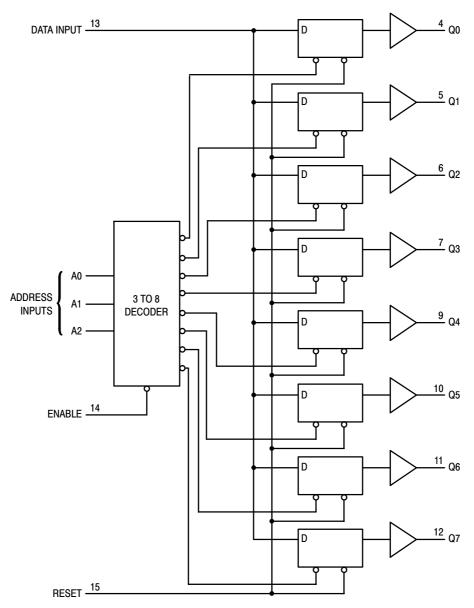


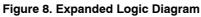


*Includes all probe and jig capacitance

Figure 7. Test Circuit

Figure 6.





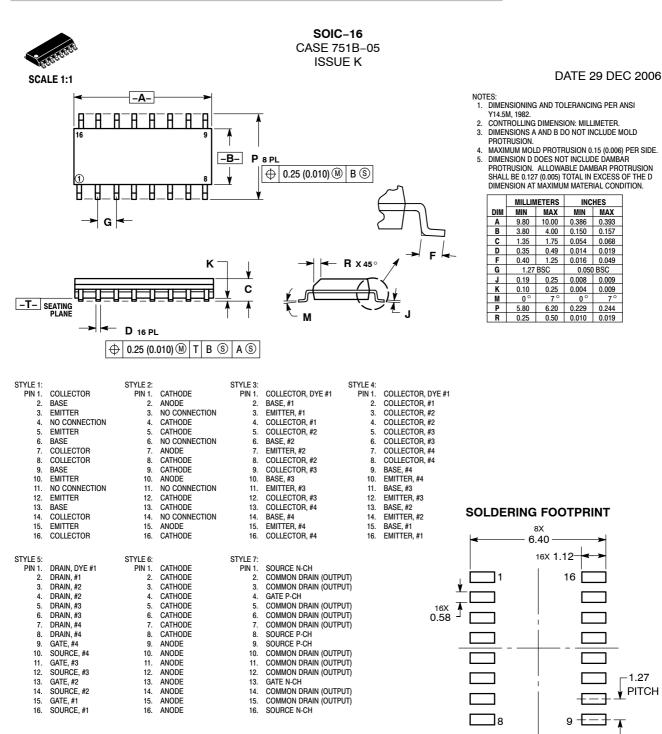
ORDERING INFORMATION

| Device | Package | Shipping [†] |
|-----------------|-----------------------|-----------------------|
| MC74HC259ADG | SOIC-16 (Pb-Free) | 48 Units / Rail |
| MC74HC259ADR2G | SOIC-16 (Pb-Free) | 2500 / Tape & Reel |
| MC74HC259ADTR2G | TSSOP-16 (Pb-Free) | 2500 / Tape & Reel |
| MC74HC259ADTG | TSSOP-16 (Pb-Free) | 96 Units / Rail |
| NLVHC259ADR2G* | SOIC-16 (Pb-Free) | 2500 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable



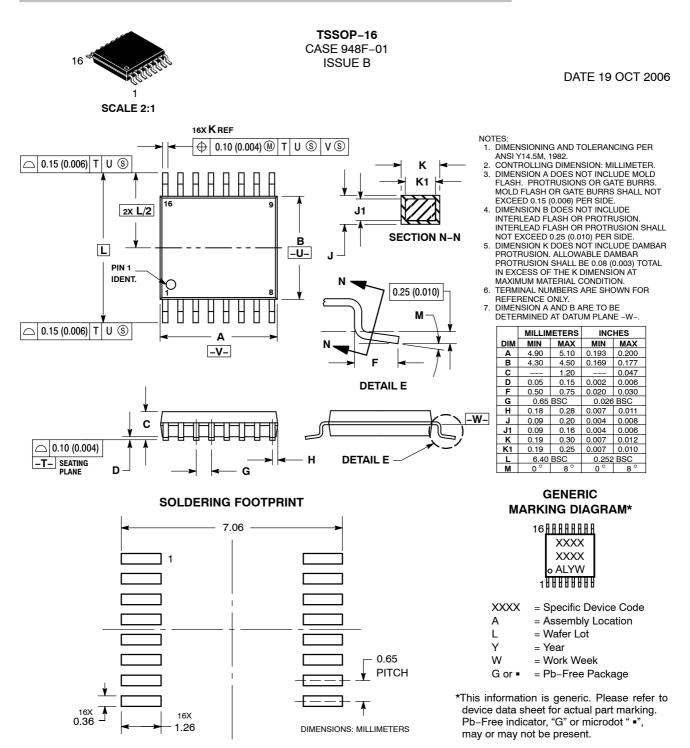


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