

# Analog Multiplexers/ Demultiplexers with Injection Current Effect Control

Automotive Customized

## MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

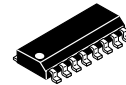
These devices are pin compatible to standard HC405x and MC1405xB analog mux/demux devices, but feature injection current effect control. This makes them especially suited for usage in automotive applications where voltages in excess of normal logic voltage are common.

The injection current effect control allows signals at disabled analog input channels to exceed the supply voltage range without affecting the signal of the enabled analog channel. This eliminates the need for external diode/resistor networks typically used to keep the analog channel signals within the supply voltage range.

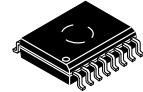
The devices utilize low power silicon gate CMOS technology. The Channel Select and Enable inputs are compatible with standard CMOS outputs.

### Features

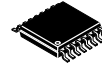
- Injection Current Cross-Coupling Less than 1 mV/mA (See Figure 10)
- Pin Compatible to HC405X and MC1405XB Devices
- Power Supply Range 2.0 to 6.0 V (HC), 4.5 to 5.5 V (HCT)
- In Compliance With the Requirements of JEDEC Standard No. 7 A
- Chip Complexity: 154 FETs or 36 Equivalent Gates
- -Q Suffix 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



SOIC-16  
D SUFFIX  
CASE 751B



SOIC-16 WIDE  
DW SUFFIX  
CASE 751G

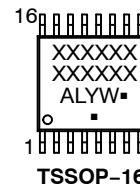
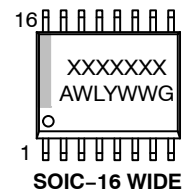
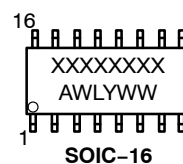


TSSOP-16  
DT SUFFIX  
CASE 948F



QFN16  
MN SUFFIX  
CASE 485AW

### MARKING DIAGRAMS



\*V4851 marking used for  
NLV74HC4851AMN1TWG

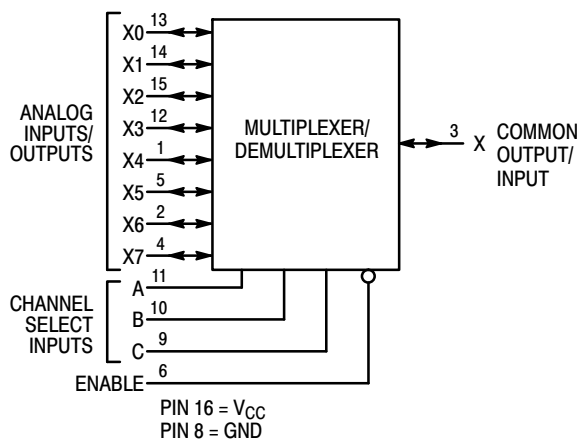
XXXXXXX = Specific Device Code  
A = Assembly Location  
WL, L = Wafer Lot  
YY, Y = Year  
WW, W = Work Week  
G or ■ = Pb-Free Package

(Note: Microdot may be in either location)

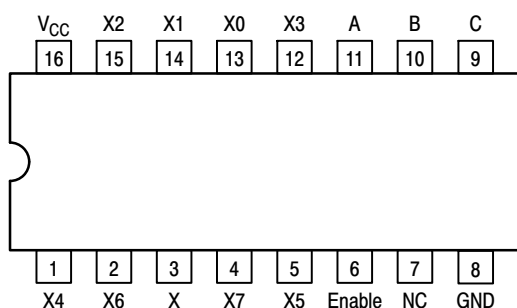
### ORDERING INFORMATION

See detailed ordering and shipping information on page 15 of this data sheet.

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A



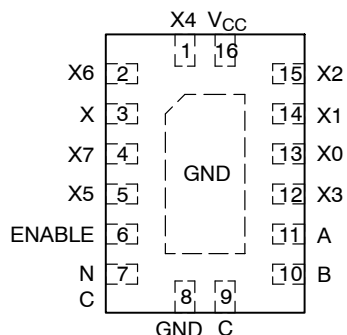
**Figure 1. 4851A Logic Diagram**  
**Single-Pole, 8-Position Plus Common Off**



**Figure 2. 4851A 16-Lead Pinout (Top View)**

**FUNCTION TABLE - 4851A**

| Control Inputs |        |   |   | ON Channels |
|----------------|--------|---|---|-------------|
| Enable         | Select |   |   |             |
|                | C      | B | A |             |
| L              | L      | L | L | X0          |
| L              | L      | L | H | X1          |
| L              | L      | H | L | X2          |
| L              | L      | H | H | X3          |
| L              | H      | L | L | X4          |
| L              | H      | L | H | X5          |
| L              | H      | H | L | X6          |
| L              | H      | H | H | X7          |
| H              | X      | X | X | NONE        |

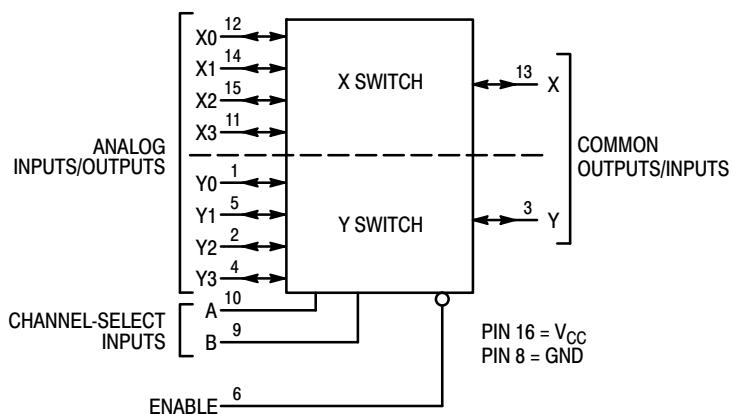


**Figure 3. 4851A QFN Pinout**

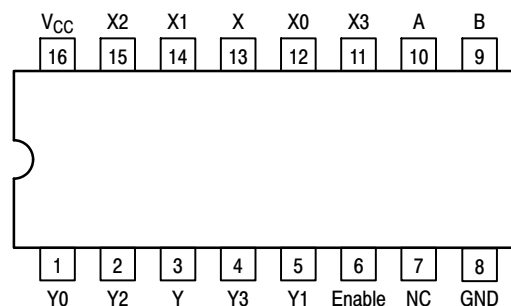
**FUNCTION TABLE - 4852A**

| Control Inputs |        |   |             |    |
|----------------|--------|---|-------------|----|
| Enable         | Select |   |             |    |
|                | B      | A | ON Channels |    |
| L              | L      | L | Y0          | X0 |
| L              | L      | H | Y1          | X1 |
| L              | H      | L | Y2          | X2 |
| L              | H      | H | Y3          | X3 |
| H              | X      | X | NONE        |    |

X = Don't Care



**Figure 4. 4852A Logic Diagram**  
**Double-Pole, 4-Position Plus Common Off**



**Figure 5. 4852A 16-Lead Pinout (Top View)**

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

## MAXIMUM RATINGS

| Symbol           | Parameter                                                                           | Value                           | Unit |
|------------------|-------------------------------------------------------------------------------------|---------------------------------|------|
| V <sub>CC</sub>  | DC Supply Voltage                                                                   | −0.5 to +6.5                    | V    |
| V <sub>IN</sub>  | DC Input Voltage                                                                    | −0.5 to V <sub>CC</sub> +0.5    | V    |
| I <sub>IN</sub>  | DC Input Current, per Pin                                                           | ±25                             | mA   |
| I <sub>CC</sub>  | DC Supply Current, V <sub>CC</sub> and GND Pins                                     | ±50                             | mA   |
| I <sub>IK</sub>  | Input Clamp Current (V <sub>IN</sub> < 0 or V <sub>IN</sub> > V <sub>CC</sub> )     | ±20                             | mA   |
| I <sub>OK</sub>  | Output Clamp Current (V <sub>OUT</sub> < 0 or V <sub>OUT</sub> > V <sub>CC</sub> )  | ±20                             | mA   |
| T <sub>STG</sub> | Storage Temperature Range                                                           | −65 to +150                     | °C   |
| T <sub>L</sub>   | Lead Temperature, 1 mm from Case for 10 secs                                        | 260                             | °C   |
| T <sub>J</sub>   | Junction Temperature Under Bias                                                     | +150                            | °C   |
| θ <sub>JA</sub>  | Thermal Resistance (Note 1)<br><div>SOIC−16<br/>QFN16<br/>TSSOP−16</div>            | <div>126<br/>118<br/>159</div>  | °C/W |
| P <sub>D</sub>   | Power Dissipation in Still Air at 25°C<br><div>SOIC−16<br/>QFN16<br/>TSSOP−16</div> | <div>995<br/>1062<br/>787</div> | mW   |
| MSL              | Moisture Sensitivity                                                                | Level 1                         | –    |
| F <sub>R</sub>   | Flammability Rating<br>Oxygen Index: 28 to 34                                       | UL 94 V−0 @ 0.125 in            | –    |
| V <sub>ESD</sub> | ESD Withstand Voltage (Note 2)<br>Human Body Model<br>Charged Device Model          | <div>&gt; 2000<br/>N/A</div>    | V    |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Measured with minimum pad spacing on an FR4 board, using 76 mm-by-114 mm, 2-ounce copper trace no air flow per JESD51-7.
2. HBM tested to EIA / JESD22-A114-A. CDM tested to JESD22-C101-A. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued.

## RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Min | Max | Unit |
|--------|-----------|-----|-----|------|
|--------|-----------|-----|-----|------|

### MC74HC

|            |                                                |                                                                               |                         |    |
|------------|------------------------------------------------|-------------------------------------------------------------------------------|-------------------------|----|
| $V_{CC}$   | DC Supply Voltage (Referenced to GND)          | 2.0                                                                           | 6.0                     | V  |
| $V_{IN}$   | DC Input Voltage – Any Pin (Referenced to GND) | 0                                                                             | $V_{CC}$                | V  |
| $V_{IO*}$  | Static or Dynamic Voltage Across Switch        | 0                                                                             | 1.2                     | V  |
| $T_A$      | Operating Free-Air Temperature                 | -55                                                                           | +125                    | °C |
| $t_r, t_f$ | Input Rise or Fall Time                        | $V_{CC} = 2.0\text{ V}$<br>$V_{CC} = 4.5\text{ V}$<br>$V_{CC} = 6.0\text{ V}$ | 0<br>1000<br>500<br>400 | ns |

### MC74HCT

|            |                                                |                         |          |    |
|------------|------------------------------------------------|-------------------------|----------|----|
| $V_{CC}$   | DC Supply Voltage (Referenced to GND)          | 4.5                     | 5.5      | V  |
| $V_{IN}$   | DC Input Voltage – Any Pin (Referenced to GND) | 0                       | $V_{CC}$ | V  |
| $V_{IO*}$  | Static or Dynamic Voltage Across Switch        | 0                       | 1.2      | V  |
| $T_A$      | Operating Free-Air Temperature                 | -55                     | +125     | °C |
| $t_r, t_f$ | Input Rise or Fall Time                        | $V_{CC} = 4.5\text{ V}$ | 0<br>500 | ns |

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

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

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

## DC CHARACTERISTICS – Digital Section (MC74HC4851A, MC74HC4852A)

| Symbol          | Parameter                                                         | Condition                                                                          | V <sub>CC</sub><br>V     | Guaranteed Limit             |                              |                              | Unit |
|-----------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------|------------------------------|------------------------------|------------------------------|------|
|                 |                                                                   |                                                                                    |                          | –55 to 25°C                  | ≤85°C                        | ≤125°C                       |      |
| V <sub>IH</sub> | Minimum High-Level Input Voltage, Channel-Select or Enable Inputs | R <sub>on</sub> = Per Spec                                                         | 2.0<br>3.0<br>4.5<br>6.0 | 1.50<br>2.10<br>3.15<br>4.20 | 1.50<br>2.10<br>3.15<br>4.20 | 1.50<br>2.10<br>3.15<br>4.20 | V    |
| V <sub>IL</sub> | Maximum Low-Level Input Voltage, Channel-Select or Enable Inputs  | R <sub>on</sub> = Per Spec                                                         | 2.0<br>3.0<br>4.5<br>6.0 | 0.50<br>0.90<br>1.35<br>1.80 | 0.50<br>0.90<br>1.35<br>1.80 | 0.50<br>0.90<br>1.35<br>1.80 | V    |
| I <sub>in</sub> | Maximum Input Leakage Current on Digital Pins (Enable/A/B/C)      | V <sub>in</sub> = V <sub>CC</sub> or GND                                           | 6.0                      | ±0.1                         | ±1.0                         | ±1.0                         | μA   |
| I <sub>CC</sub> | Maximum Quiescent Supply Current (per Package)                    | V <sub>in(digital)</sub> = V <sub>CC</sub> or GND<br>V <sub>in(analog)</sub> = GND | 6.0                      | 2                            | 20                           | 40                           | μA   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## DC CHARACTERISTICS – Analog Section (MC74HC4851A, MC74HC4852A)

| Symbol           | Parameter                                                           | Condition                                                                                                                                  | V <sub>CC</sub>          | Guaranteed Limit           |                            |                            | Unit |
|------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------|----------------------------|----------------------------|------|
|                  |                                                                     |                                                                                                                                            |                          | –55 to 25°C                | ≤85°C                      | ≤125°C                     |      |
| R <sub>on</sub>  | Maximum “ON” Resistance                                             | V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; V <sub>IS</sub> = V <sub>CC</sub> to GND (Note 4); I <sub>S</sub> ≤ 2.0 mA (Note 5) | 2.0<br>3.0<br>4.5<br>6.0 | 1700<br>1100<br>550<br>400 | 1750<br>1200<br>650<br>500 | 1800<br>1300<br>750<br>600 | Ω    |
| ΔR <sub>on</sub> | Delta “ON” Resistance                                               | V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; V <sub>IS</sub> = V <sub>CC</sub> /2 (Note 4); I <sub>S</sub> ≤ 2.0 mA (Note 5)     | 2.0<br>3.0<br>4.5<br>6.0 | 300<br>160<br>80<br>60     | 400<br>200<br>100<br>80    | 500<br>240<br>120<br>100   | Ω    |
| I <sub>off</sub> | Maximum Off-Channel Leakage Current, Any One Channel Common Channel | V <sub>in</sub> = V <sub>CC</sub> or GND                                                                                                   | 6.0                      | ±0.1<br>±0.1               | ±0.1<br>±0.1               | ±0.1<br>±0.1               | μA   |
| I <sub>on</sub>  | Maximum On-Channel Leakage Channel-to-Channel                       | V <sub>in</sub> = V <sub>CC</sub> or GND                                                                                                   | 6.0                      | ±0.1                       | ±0.1                       | ±0.1                       | μA   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. V<sub>IS</sub> is the input voltage of an analog I/O pin.

5. I<sub>S</sub> is the current flowing in or out of analog I/O pin.

## AC CHARACTERISTICS (MC74HC4851A, MC74HC4852A) (C<sub>L</sub> = 50 pF)

| Symbol                                                                                     | Parameter                                                                                                                           | V <sub>CC</sub>          | –55 to 25°C            | ≤85°C                  | ≤125°C                  | Unit |
|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------|------------------------|-------------------------|------|
| t <sub>PHL</sub> ,<br>t <sub>PLH</sub>                                                     | Maximum Propagation Delay, Analog Input to Analog Output                                                                            | 2.0<br>3.0<br>4.5<br>6.0 | 160<br>80<br>40<br>30  | 180<br>90<br>45<br>35  | 200<br>100<br>50<br>40  | ns   |
| t <sub>PHL</sub> ,<br>t <sub>PHZ,PZH</sub> ,<br>t <sub>PLH</sub> ,<br>t <sub>PLZ,PZL</sub> | Maximum Propagation Delay, Enable or Channel-Select to Analog Output                                                                | 2.0<br>3.0<br>4.5<br>6.0 | 260<br>160<br>80<br>78 | 280<br>180<br>90<br>80 | 300<br>200<br>100<br>80 | ns   |
| C <sub>in</sub>                                                                            | Maximum Input Capacitance<br>(All Switches Off)<br>Digital Pins<br>(All Switches Off)<br>Any Single Analog Pin<br>Common Analog Pin |                          | 10<br>35<br>40         | 10<br>35<br>40         | 10<br>35<br>40          | pF   |
| C <sub>PD</sub>                                                                            | Power Dissipation Capacitance<br>Typical                                                                                            | 5.0                      | 20                     |                        |                         | pF   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

## INJECTION CURRENT COUPLING SPECIFICATIONS (MC74HC4851A, MC74HC4852A) ( $V_{CC} = 5\text{ V}$ , $T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$ )

| Symbol           | Parameter                                                 | Condition                                                                                                                                                                                                                                                | Typ                      | Max                     | Unit |
|------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------|------|
| $V_{\Delta out}$ | Maximum Shift of Output Voltage of Enabled Analog Channel | $I_{in}^* \leq 1\text{ mA}$ , $R_S \leq 3,9\text{ k}\Omega$<br>$I_{in}^* \leq 10\text{ mA}$ , $R_S \leq 3,9\text{ k}\Omega$<br>$I_{in}^* \leq 1\text{ mA}$ , $R_S \leq 20\text{ k}\Omega$<br>$I_{in}^* \leq 10\text{ mA}$ , $R_S \leq 20\text{ k}\Omega$ | 0.1<br>1.0<br>0.5<br>5.0 | 1.0<br>5.0<br>2.0<br>20 | mV   |

\* $I_{in}$  = Total current injected into all disabled channels.

## DC CHARACTERISTICS – Digital Section (MC74HCT4851A, MC74HCT4852A)

| Symbol   | Parameter                                                         | Condition                                                                        | $V_{CC}$<br>V | Guaranteed Limit            |                         |                          | Unit          |
|----------|-------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------|-----------------------------|-------------------------|--------------------------|---------------|
|          |                                                                   |                                                                                  |               | $-55$ to $25^\circ\text{C}$ | $\leq 85^\circ\text{C}$ | $\leq 125^\circ\text{C}$ |               |
| $V_{IH}$ | Minimum High-Level Input Voltage, Channel-Select or Enable Inputs | $R_{on} = \text{Per Spec}$                                                       | 4.5 to 5.5    | 2.0                         | 2.0                     | 2.0                      | V             |
| $V_{IL}$ | Maximum Low-Level Input Voltage, Channel-Select or Enable Inputs  | $R_{on} = \text{Per Spec}$                                                       | 4.5 to 5.5    | 0.8                         | 0.8                     | 0.8                      | V             |
| $I_{in}$ | Maximum Input Leakage Current on Digital Pins (Enable/A/B/C)      | $V_{in} = V_{CC}$ or GND                                                         | 5.5           | $\pm 0.1$                   | $\pm 1.0$               | $\pm 1.0$                | $\mu\text{A}$ |
| $I_{CC}$ | Maximum Quiescent Supply Current (per Package)                    | $V_{in(\text{digital})} = V_{CC}$ or GND<br>$V_{in(\text{analog})} = \text{GND}$ | 5.5           | 2.0                         | 20                      | 40                       | $\mu\text{A}$ |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## DC CHARACTERISTICS – Analog Section (MC74HCT4851A, MC74HCT4852A)

| Symbol          | Parameter                                                           | Condition                                                                                            | $V_{CC}$   | Guaranteed Limit            |                         |                          | Unit          |
|-----------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------|-----------------------------|-------------------------|--------------------------|---------------|
|                 |                                                                     |                                                                                                      |            | $-55$ to $25^\circ\text{C}$ | $\leq 85^\circ\text{C}$ | $\leq 125^\circ\text{C}$ |               |
| $R_{on}$        | Maximum "ON" Resistance                                             | $V_{in} = V_{IL}$ or $V_{IH}$ ; $V_{IS} = V_{CC}$ to GND (Note 4); $I_S \leq 2.0\text{ mA}$ (Note 5) | 4.5<br>5.5 | 550<br>400                  | 650<br>500              | 750<br>600               | $\Omega$      |
| $\Delta R_{on}$ | Delta "ON" Resistance                                               | $V_{in} = V_{IL}$ or $V_{IH}$ ; $V_{IS} = V_{CC}/2$ (Note 4); $I_S \leq 2.0\text{ mA}$ (Note 5)      | 4.5<br>5.5 | 80<br>60                    | 100<br>80               | 120<br>100               | $\Omega$      |
| $I_{off}$       | Maximum Off-Channel Leakage Current, Any One Channel Common Channel | $V_{in} = V_{CC}$ or GND                                                                             | 5.5        | $\pm 0.1$<br>$\pm 0.1$      | $\pm 0.1$<br>$\pm 0.1$  | $\pm 0.1$<br>$\pm 0.1$   | $\mu\text{A}$ |
| $I_{on}$        | Maximum On-Channel Leakage Channel-to-Channel                       | $V_{in} = V_{CC}$ or GND                                                                             | 5.5        | $\pm 0.1$                   | $\pm 0.1$               | $\pm 0.1$                | $\mu\text{A}$ |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

## AC CHARACTERISTICS (MC74HCT4851A, MC74HCT4852A) ( $C_L = 50 \text{ pF}$ )

| Symbol                                                         | Parameter                                                                                                                           | $V_{CC}$ | $-55 \text{ to } 25^\circ\text{C}$ | $\leq 85^\circ\text{C}$ | $\leq 125^\circ\text{C}$ | Unit |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------|-------------------------|--------------------------|------|
| $t_{PHL}$ ,<br>$t_{PLH}$                                       | Maximum Propagation Delay, Analog Input to Analog Output                                                                            | 5.0      | 40                                 | 45                      | 50                       | ns   |
| $t_{PHL}$ ,<br>$t_{PHZ,PZH}$ ,<br>$t_{PLH}$ ,<br>$t_{PLZ,PZL}$ | Maximum Propagation Delay, Enable or Channel-Select to Analog Output                                                                | 5.0      | 80                                 | 90                      | 100                      | ns   |
| $C_{in}$                                                       | Maximum Input Capacitance<br>Digital Pins<br>(All Switches Off)<br>Any Single Analog Pin<br>(All Switches Off)<br>Common Analog Pin |          | 10<br>35<br>40                     | 10<br>35<br>40          | 10<br>35<br>40           | pF   |
| $C_{PD}$                                                       | Power Dissipation Capacitance<br>Typical                                                                                            | 5.0      | 20                                 |                         |                          | pF   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## INJECTION CURRENT COUPLING SPECIFICATIONS (MC74HCT4851A, MC74HCT4852A) ( $V_{CC} = 5 \text{ V}$ , $T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$ )

| Symbol           | Parameter                                                 | Condition                                                                                                                                                                                                                                                        | Typ                      | Max                     | Unit |
|------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------|------|
| $V_{\Delta out}$ | Maximum Shift of Output Voltage of Enabled Analog Channel | $I_{in}^* \leq 1 \text{ mA}$ , $R_S \leq 3.9 \text{ k}\Omega$<br>$I_{in}^* \leq 10 \text{ mA}$ , $R_S \leq 3.9 \text{ k}\Omega$<br>$I_{in}^* \leq 1 \text{ mA}$ , $R_S \leq 20 \text{ k}\Omega$<br>$I_{in}^* \leq 10 \text{ mA}$ , $R_S \leq 20 \text{ k}\Omega$ | 0.1<br>1.0<br>0.5<br>5.0 | 1.0<br>5.0<br>2.0<br>20 | mV   |

\* $I_{in}$  = Total current injected into all disabled channels.

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

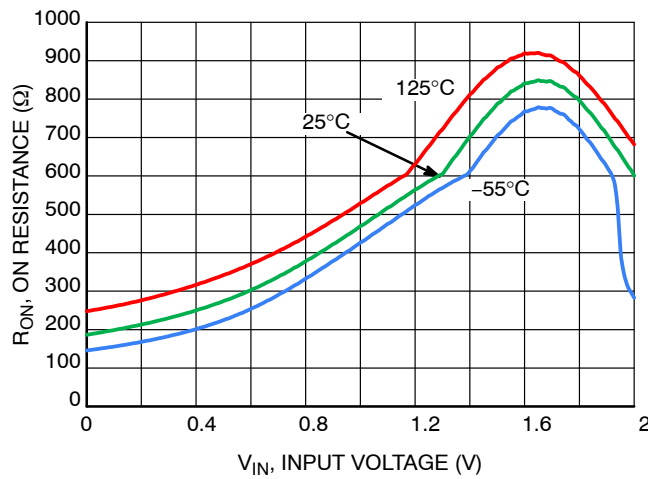


Figure 6. Typical On Resistance  $V_{CC} = 2\text{ V}$

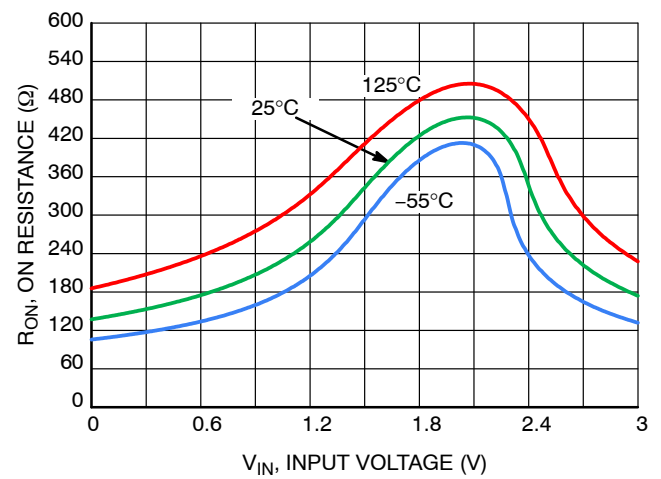


Figure 7. Typical On Resistance  $V_{CC} = 3\text{ V}$

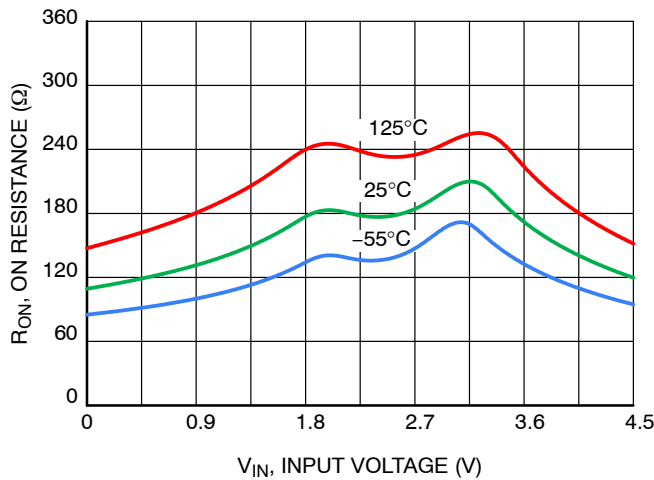


Figure 8. Typical On Resistance  $V_{CC} = 4.5\text{ V}$

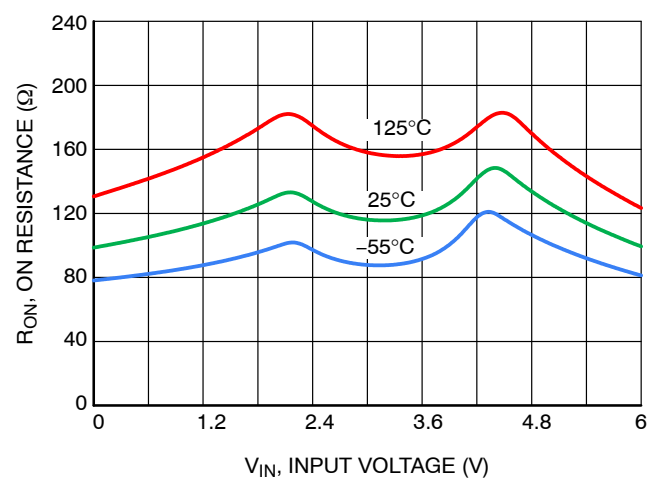


Figure 9. Typical On Resistance  $V_{CC} = 6\text{ V}$

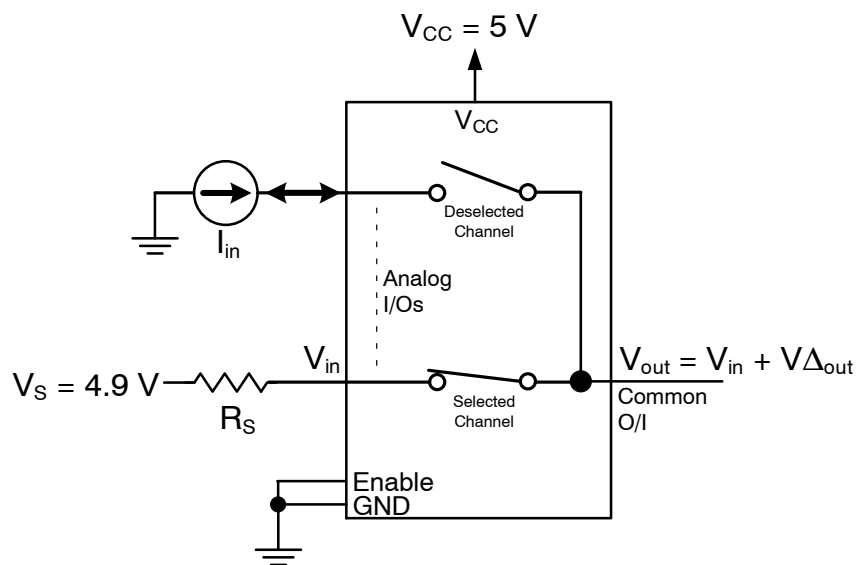
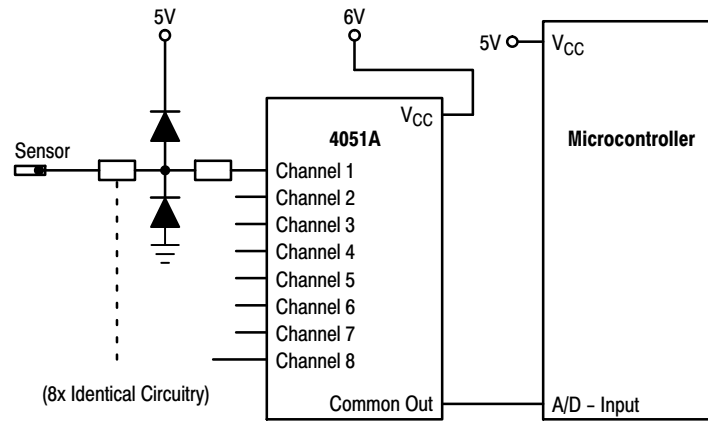


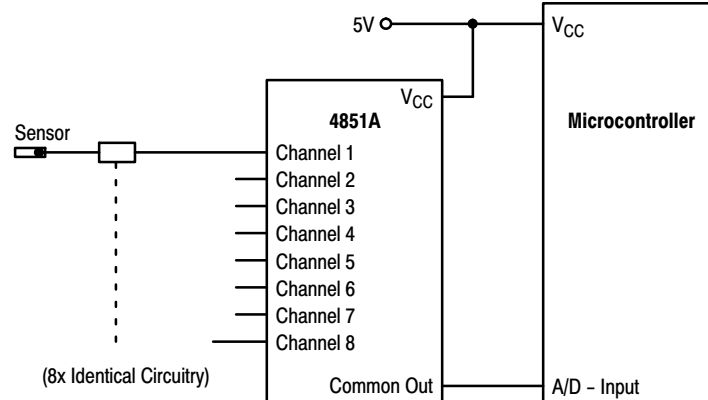
Figure 10. Injection Current Coupling Specification

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A



**Figure 11. Actual Technology**

Requires 32 passive components and one extra 6 V regulator to suppress injection current into a standard 4051 multiplexer



**Figure 12. 4851A Solution**

Solution by applying the 4851A multiplexer

## TEST SETUPS

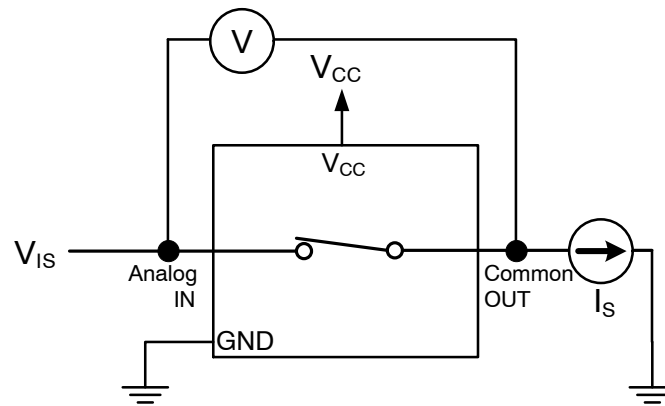


Figure 13. On Resistance

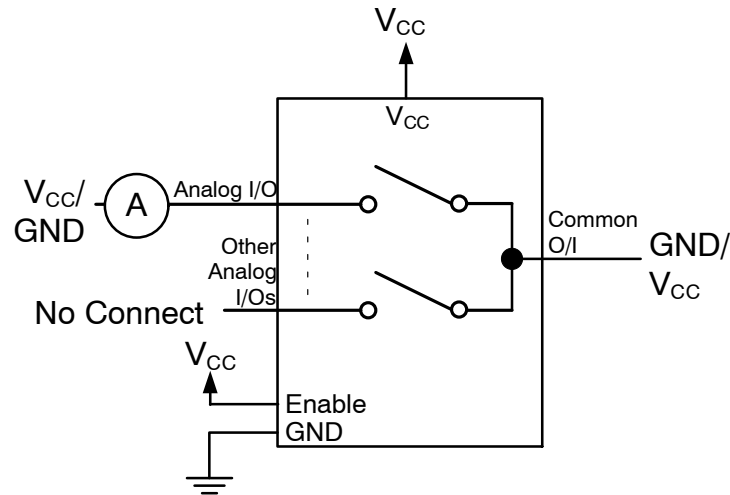


Figure 14. Maximum Off Channel Leakage Current, Any One Channel

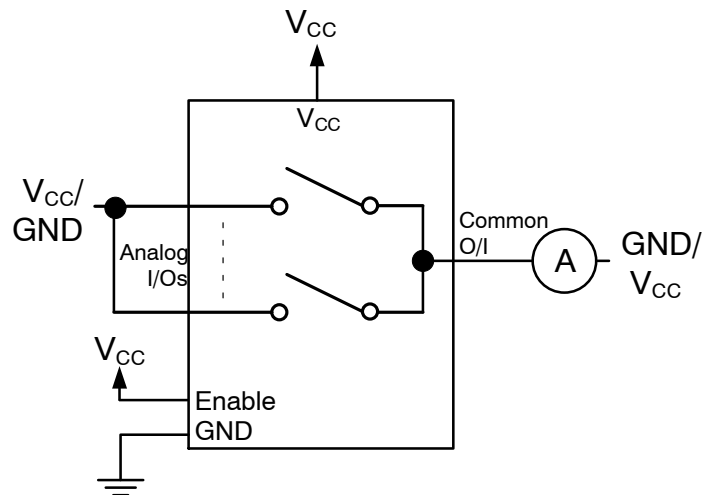


Figure 15. Maximum Off Channel Leakage Current, Common Channel

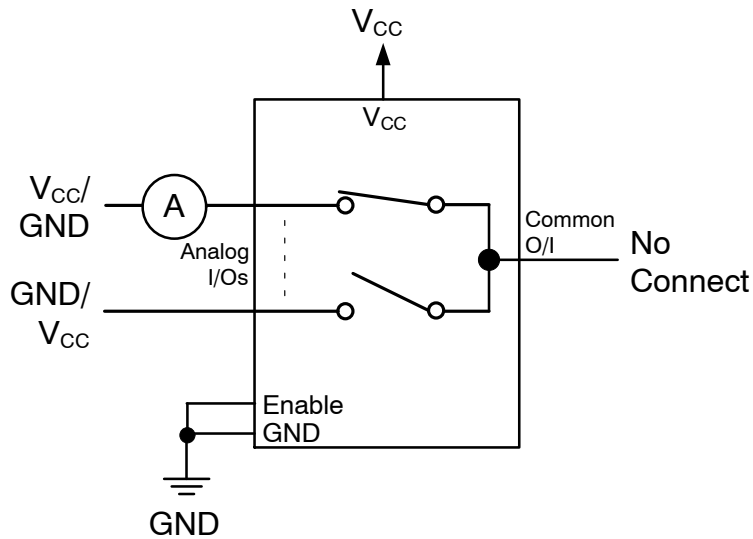
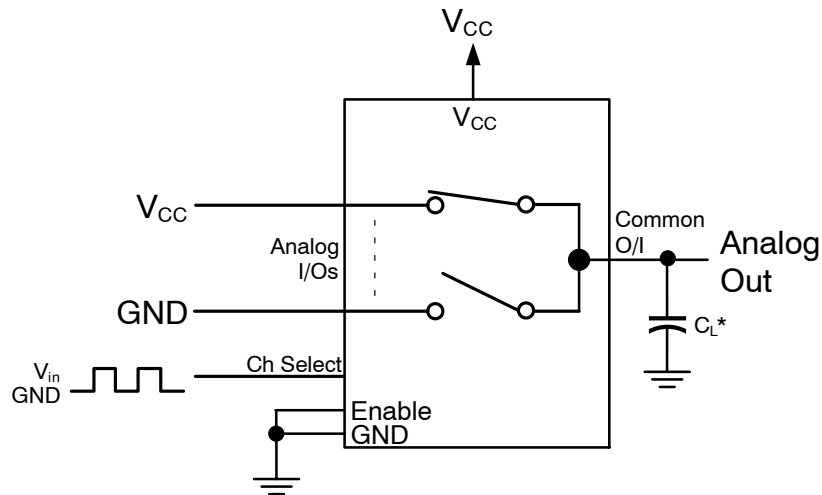
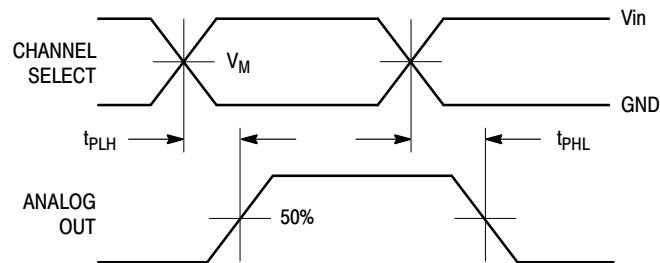


Figure 16. Maximum On Channel Leakage Current, Channel to Channel

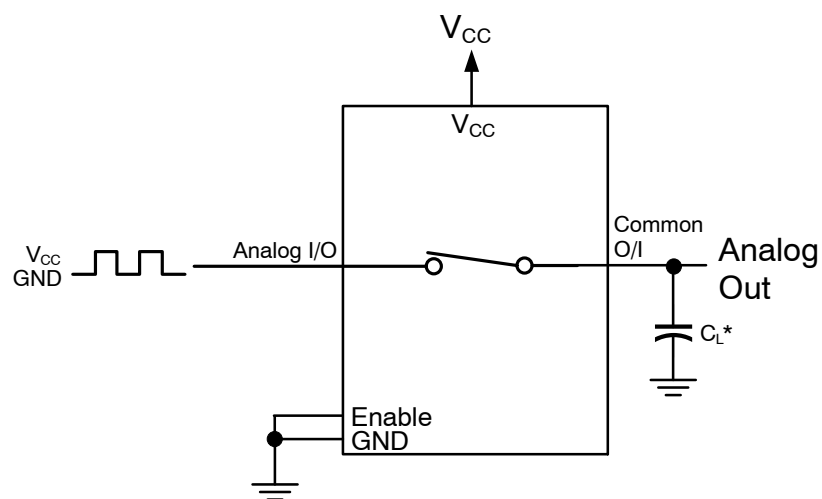


\*Includes all probe and jig capacitance.



$V_{in} = V_{CC}$  for HC, 3 V for HCT  
 $V_M = 50\% \times V_{CC}$  for HC, 1.3 V for HCT

Figure 17. Propagation Delay, Channel Select to Analog Out



\*Includes all probe and jig capacitance.

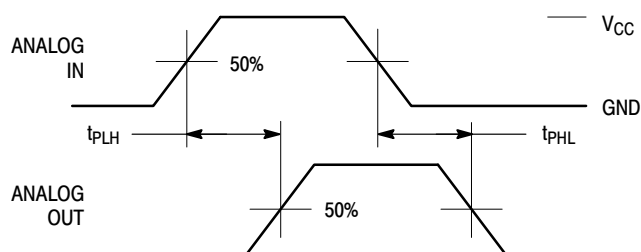
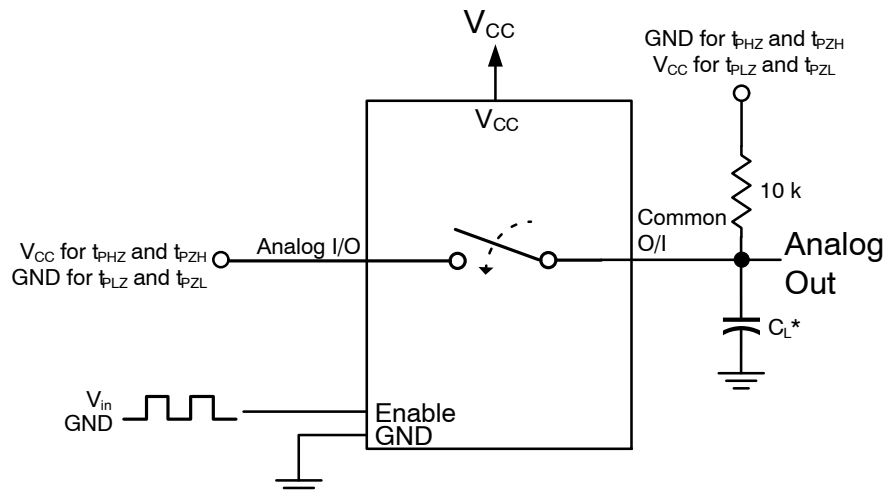


Figure 18. Propagation Delay, Analog In to Analog Out



\*Includes all probe and jig capacitance.

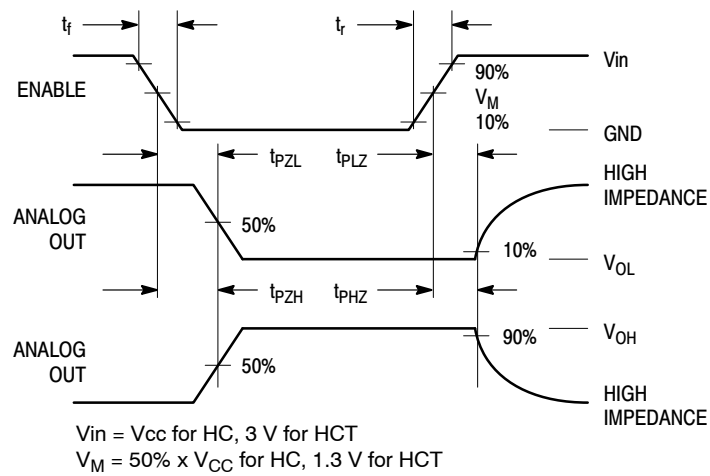


Figure 19. Propagation Delay, Enable to Analog Out

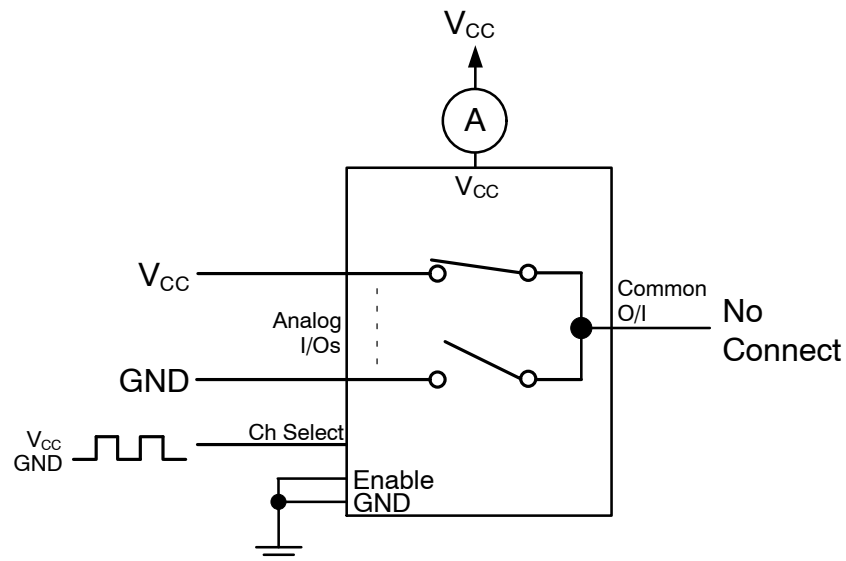
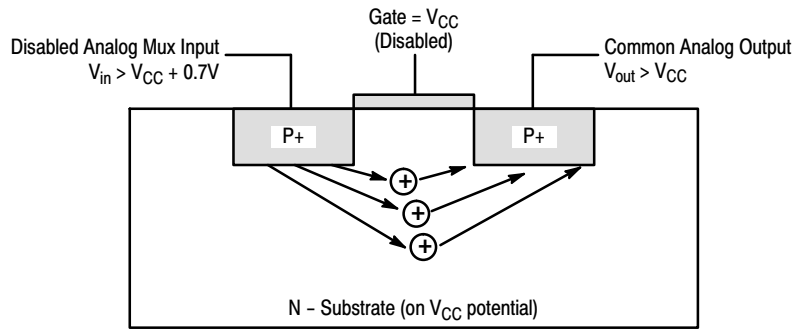
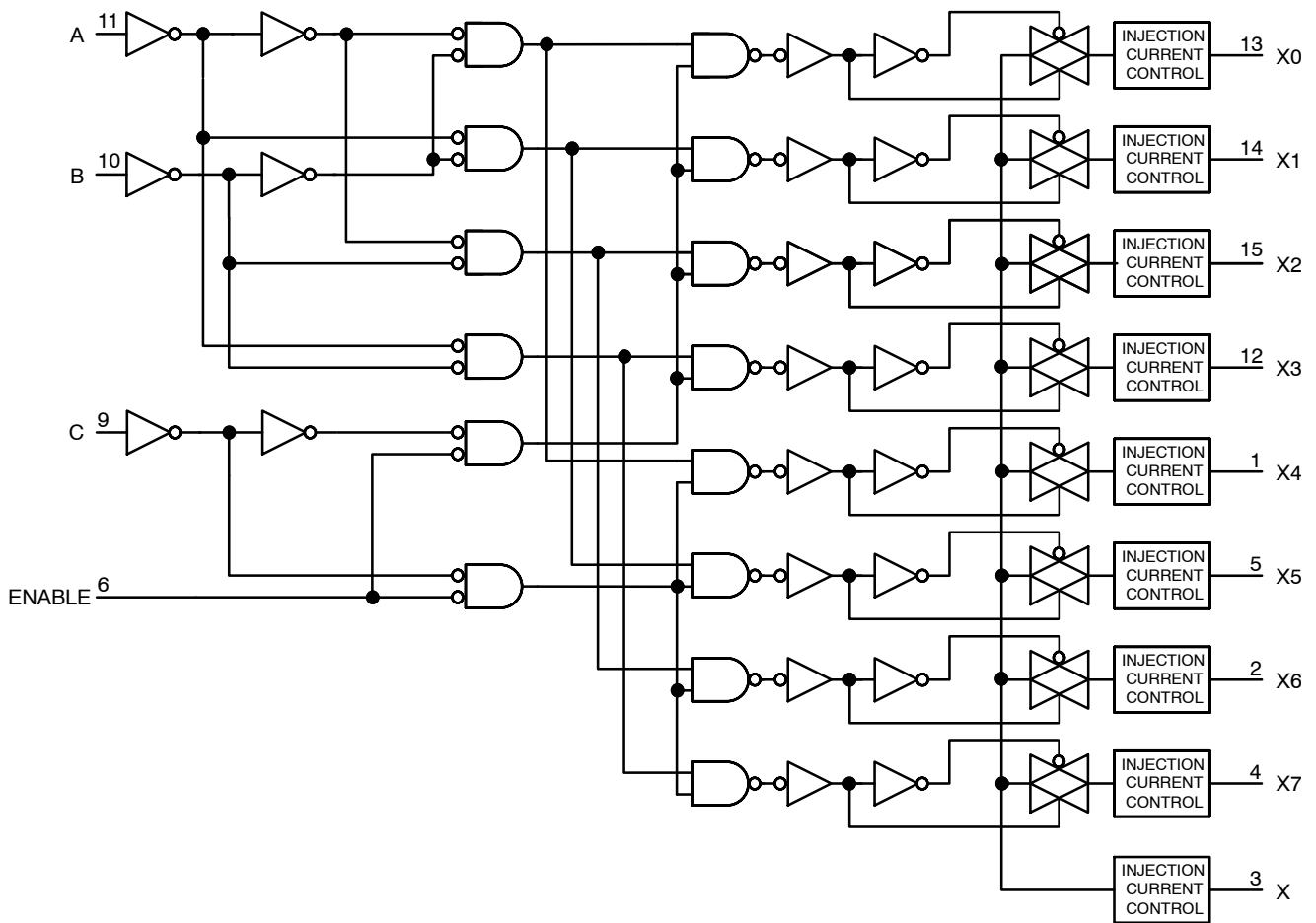


Figure 20. Power Dissipation Capacitance

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A



**Figure 21. Diagram of Bipolar Coupling Mechanism**  
Appears if  $V_{in}$  exceeds  $V_{CC}$ , driving injection current into the substrate



**Figure 22. Function Diagram, 4851A**

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

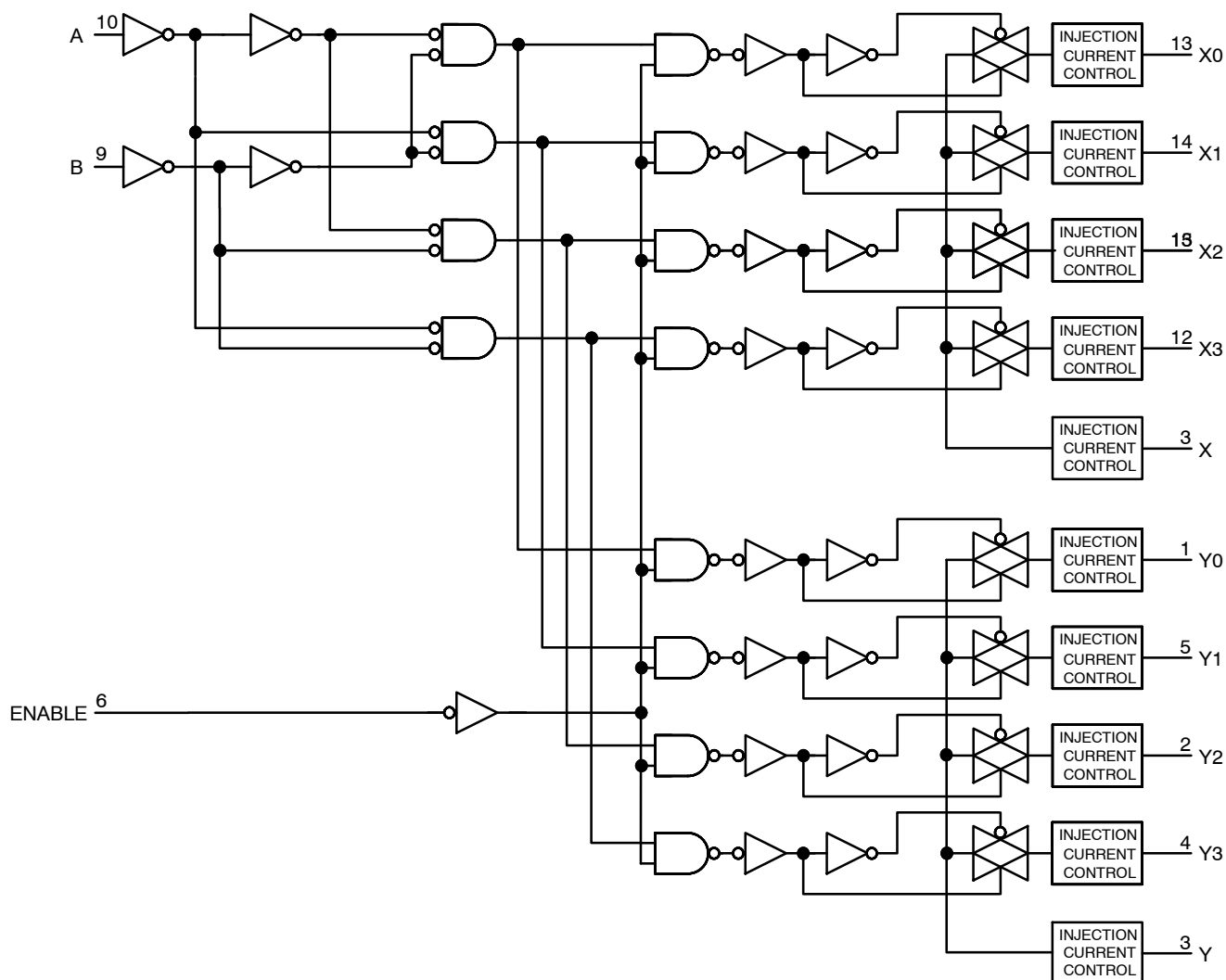


Figure 23. Function Diagram, 4852A

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

## ORDERING INFORMATION

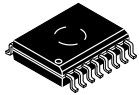
| Device               | Marking      | Package  | Shipping <sup>†</sup> |
|----------------------|--------------|----------|-----------------------|
| MC74HC4851ADG        | HC4851AG     | SOIC-16  | 55 Units / Rail       |
| MC74HC4851ADR2G      | HC4851AG     | SOIC-16  | 2500 / Tape & Reel    |
| MC74HC4851ADR2G-Q*   | HC4851AG     | SOIC-16  | 2500 / Tape & Reel    |
| MC74HC4851ADTR2G     | HC48<br>51A  | TSSOP-16 | 2500 / Tape & Reel    |
| MC74HC4851ADTR2G-Q*  | HC48<br>51A  | TSSOP-16 | 2500 / Tape & Reel    |
| MC74HC4851AMN1TWG-Q* | 4851         | QFN-16   | 3000 / Tape & Reel    |
| MC74HC4852ADR2G      | HC4852AG     | SOIC-16  | 2500 / Tape & Reel    |
| MC74HC4852ADR2G-Q*   | HC4852AG     | SOIC-16  | 2500 / Tape & Reel    |
| MC74HC4852ADTR2G     | HC48<br>52A  | TSSOP-16 | 2500 / Tape & Reel    |
| MC74HC4852ADTR2G-Q*  | HC48<br>52A  | TSSOP-16 | 2500 / Tape & Reel    |
| MC74HCT4851ADR2G     | HCT4851AG    | SOIC-16  | 2500 / Tape & Reel    |
| MC74HCT4851ADTR2G    | HCT4<br>851A | TSSOP-16 | 2500 / Tape & Reel    |
| MC74HCT4851ADTR2G-Q* | HCT4<br>851A | TSSOP-16 | 2500 / Tape & Reel    |
| MC74HCT4852ADR2G     | HCT4852AG    | SOIC-16  | 2500 / Tape & Reel    |
| MC74HCT4852ADTR2G    | HCT4<br>852A | TSSOP-16 | 2500 / Tape & Reel    |

<sup>†</sup>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.

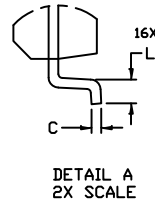
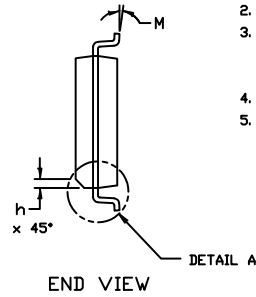
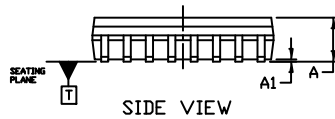
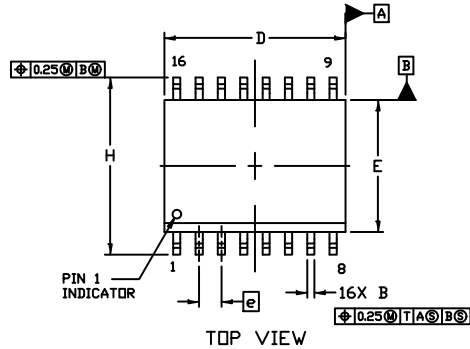
\*-Q Suffix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

## PACKAGE DIMENSIONS



1  
SCALE 1:1

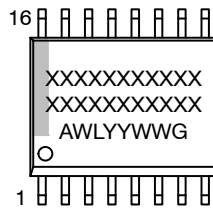


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSIONS.
5. MAXIMUM MOLD PROTRUSION OR FLASH TO BE 0.15 PER SIDE.

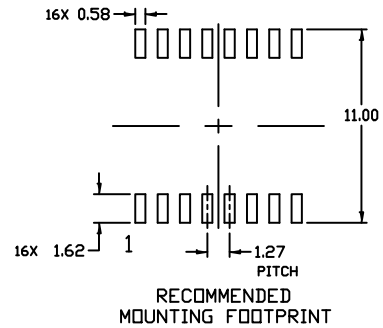
| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN.        | MAX.  |
| A   | 2.35        | 2.65  |
| A1  | 0.10        | 0.25  |
| B   | 0.35        | 0.49  |
| C   | 0.23        | 0.32  |
| D   | 10.15       | 10.45 |
| E   | 7.40        | 7.60  |
| e   | 1.27 BSC    |       |
| H   | 10.05       | 10.55 |
| h   | 0.53 REF    |       |
| L   | 0.50        | 0.90  |
| M   | 0°          | 7°    |

### GENERIC MARKING DIAGRAM\*



XXXXXX = Specific Device Code  
 A = Assembly Location  
 WL = Wafer Lot  
 YY = Year  
 WW = Work Week  
 G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



# MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

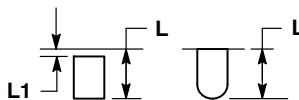
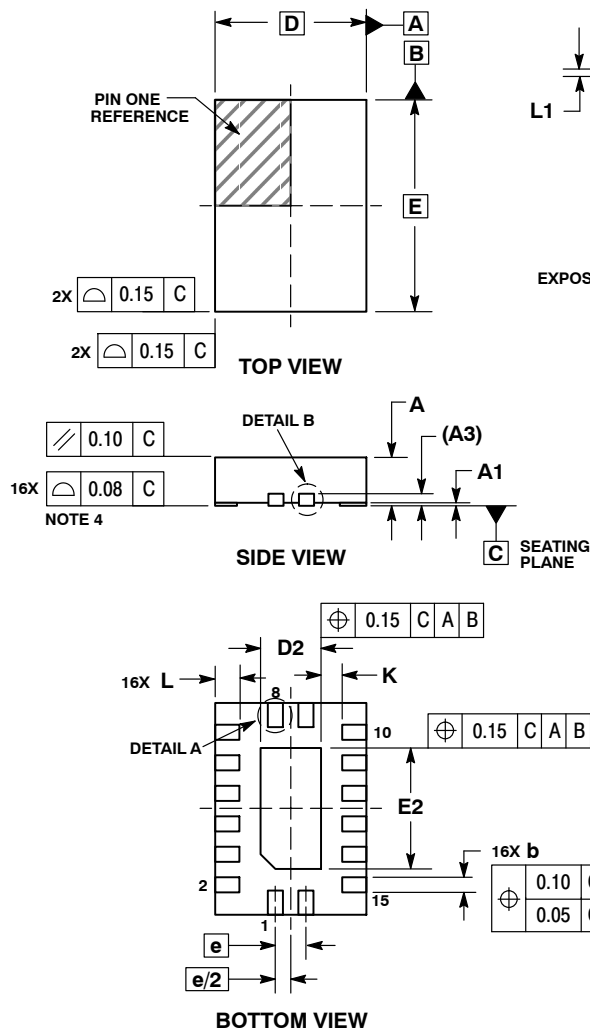
## PACKAGE DIMENSIONS



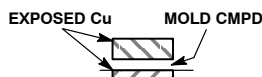
SCALE 2:1

QFN16, 2.5x3.5, 0.5P  
CASE 485AW  
ISSUE O

DATE 11 DEC 2008



**DETAIL A**  
ALTERNATE TERMINAL  
CONSTRUCTIONS



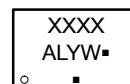
**DETAIL B**  
ALTERNATE  
CONSTRUCTIONS

### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

| MILLIMETERS |      |      |
|-------------|------|------|
| DIM         | MIN  | MAX  |
| A           | 0.80 | 1.00 |
| A1          | 0.00 | 0.05 |
| A3          | 0.20 | REF  |
| b           | 0.20 | 0.30 |
| D           | 2.50 | BSC  |
| D2          | 0.85 | 1.15 |
| E           | 3.50 | BSC  |
| E2          | 1.85 | 2.15 |
| e           | 0.50 | BSC  |
| K           | 0.20 | ---  |
| L           | 0.35 | 0.45 |
| L1          | ---  | 0.15 |

### GENERIC MARKING DIAGRAM\*

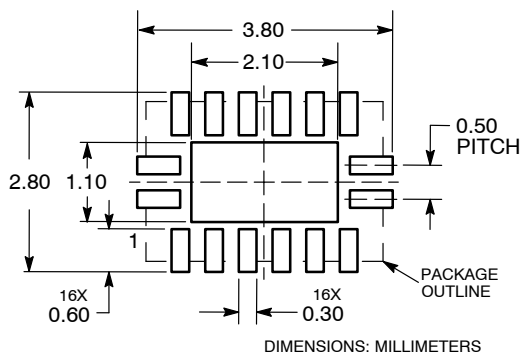


- XXXX = Specific Device Code  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

### RECOMMENDED SOLDERING FOOTPRINT\*



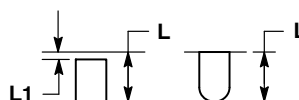
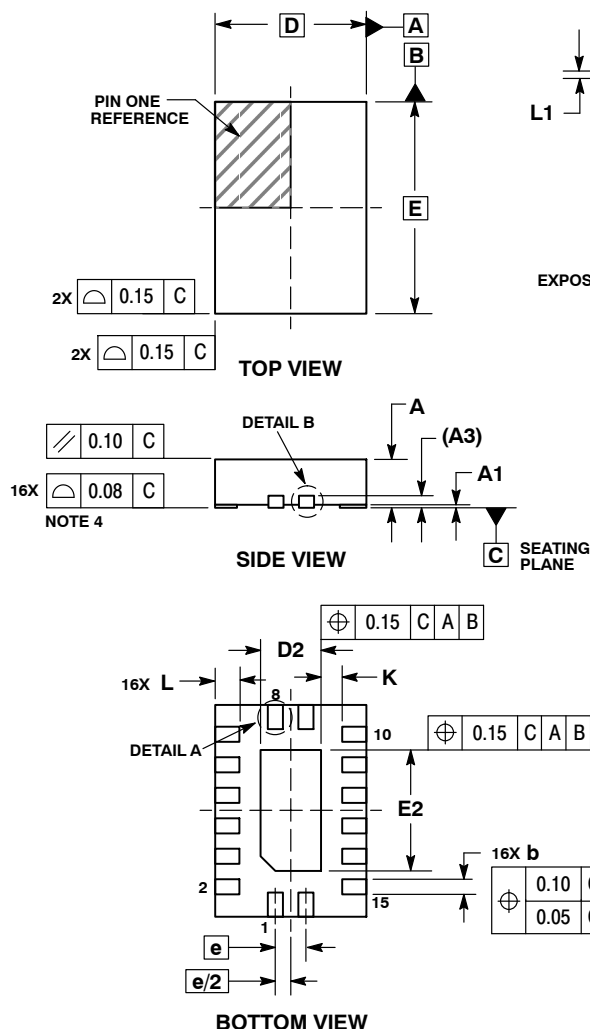
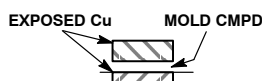
\*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



SCALE 2:1

**QFN16, 2.5x3.5, 0.5P**  
CASE 485AW  
ISSUE O

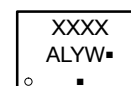
DATE 11 DEC 2008


**DETAIL A**  
ALTERNATE TERMINAL  
CONSTRUCTIONS

**DETAIL B**  
ALTERNATE  
CONSTRUCTIONS

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

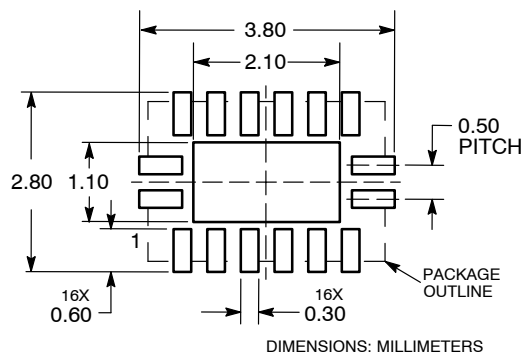
| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 0.80        | 1.00 |
| A1  | 0.00        | 0.05 |
| A3  | 0.20 REF    |      |
| b   | 0.20        | 0.30 |
| D   | 2.50 BSC    |      |
| D2  | 0.85        | 1.15 |
| E   | 3.50 BSC    |      |
| E2  | 1.85        | 2.15 |
| e   | 0.50 BSC    |      |
| K   | 0.20        | ---  |
| L   | 0.35        | 0.45 |
| L1  | ---         | 0.15 |

**GENERIC MARKING**  
**DIAGRAM\***


XXXX = Specific Device Code  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

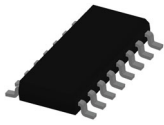
\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

**RECOMMENDED**  
**SOLDERING FOOTPRINT\***


\*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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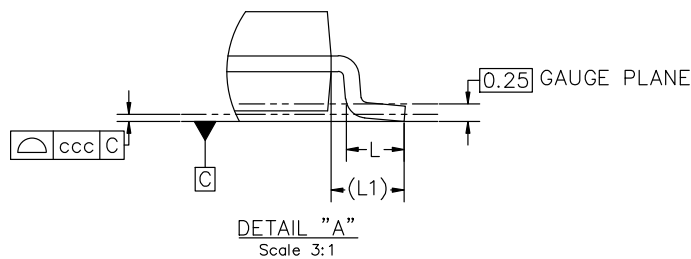
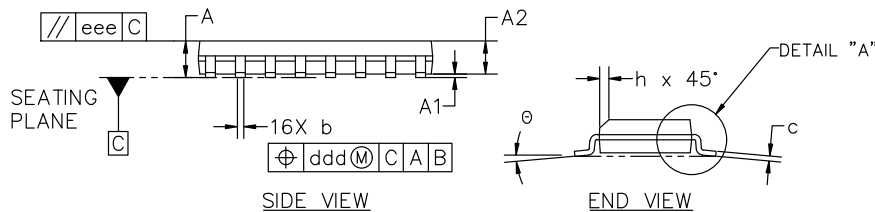
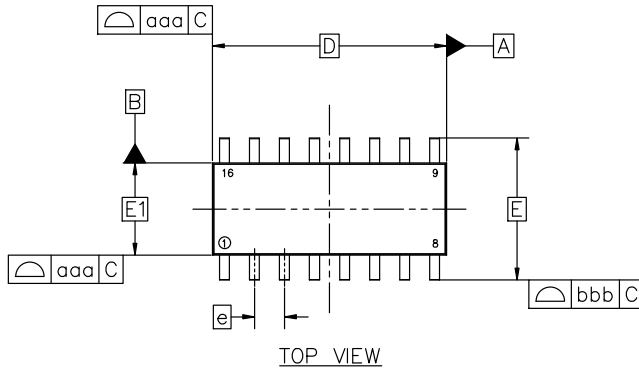
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**SOIC-16 9.90x3.90x1.37 1.27P**  
**CASE 751B**  
**ISSUE M**

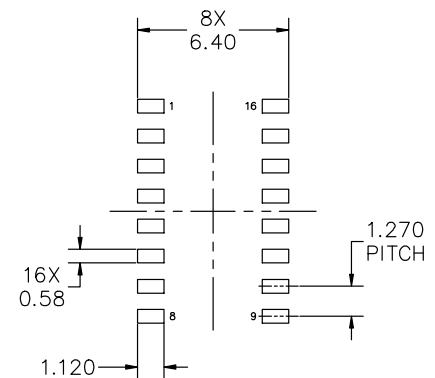
DATE 18 OCT 2024

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. DIMENSION IN MILLIMETERS. ANGLE IN DEGREES.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15mm PER SIDE.
5. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127mm TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION.



| MILLIMETERS                    |          |      |      |
|--------------------------------|----------|------|------|
| DIM                            | MIN      | NOM  | MAX  |
| A                              | 1.35     | 1.55 | 1.75 |
| A1                             | 0.10     | 0.18 | 0.25 |
| A2                             | 1.25     | 1.37 | 1.50 |
| b                              | 0.35     | 0.42 | 0.49 |
| c                              | 0.19     | 0.22 | 0.25 |
| D                              | 9.90 BSC |      |      |
| E                              | 6.00 BSC |      |      |
| E1                             | 3.90 BSC |      |      |
| e                              | 1.27 BSC |      |      |
| h                              | 0.25     | ---  | 0.50 |
| L                              | 0.40     | 0.83 | 1.25 |
| L1                             | 1.05 REF |      |      |
| θ                              | 0°       | ---  | 7°   |
| TOLERANCE OF FORM AND POSITION |          |      |      |
| aaa                            | 0.10     |      |      |
| bbb                            | 0.20     |      |      |
| ccc                            | 0.10     |      |      |
| ddd                            | 0.25     |      |      |
| eee                            | 0.10     |      |      |



## RECOMMENDED MOUNTING FOOTPRINT

\*FOR ADDITIONAL INFORMATION ON OUR  
PB-FREE STRATEGY AND SOLDERING DETAILS,  
PLEASE DOWNLOAD THE onsemi SOLDERING  
AND MOUNTING TECHNIQUES REFERENCE  
MANUAL, SOLDERM/D

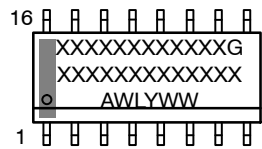
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|-------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DOCUMENT NUMBER:</b> | <b>98ASB42566B</b>                  | Electronic versions are uncontrolled except when accessed directly from the Document Repository.<br>Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| <b>DESCRIPTION:</b>     | <b>SOIC-16 9.90X3.90X1.37 1.27P</b> | <b>PAGE 1 OF 2</b>                                                                                                                                                                  |

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SOIC-16 9.90x3.90x1.37 1.27P  
CASE 751B  
ISSUE M

DATE 18 OCT 2024

GENERIC  
MARKING DIAGRAM\*

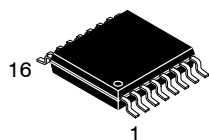


XXXXX = Specific Device Code  
A = Assembly Location  
WL = Wafer Lot  
Y = Year  
WW = Work Week  
G = Pb-Free Package

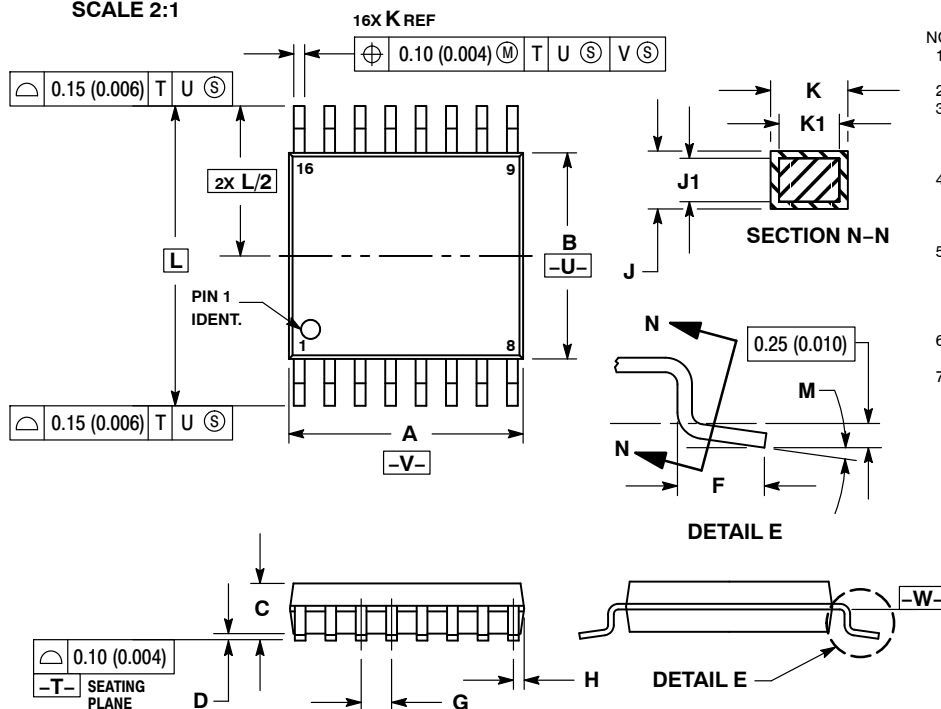
\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

|                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STYLE 1:<br>PIN 1. COLLECTOR<br>2. BASE<br>3. EMITTER<br>4. NO CONNECTION<br>5. EMITTER<br>6. BASE<br>7. COLLECTOR<br>8. COLLECTOR<br>9. BASE<br>10. EMITTER<br>11. NO CONNECTION<br>12. EMITTER<br>13. BASE<br>14. COLLECTOR<br>15. EMITTER<br>16. COLLECTOR                           | STYLE 2:<br>PIN 1. CATHODE<br>2. ANODE<br>3. NO CONNECTION<br>4. CATHODE<br>5. CATHODE<br>6. NO CONNECTION<br>7. ANODE<br>8. CATHODE<br>9. CATHODE<br>10. ANODE<br>11. NO CONNECTION<br>12. CATHODE<br>13. CATHODE<br>14. NO CONNECTION<br>15. ANODE<br>16. CATHODE | STYLE 3:<br>PIN 1. COLLECTOR, DYE #1<br>2. BASE, #1<br>3. EMITTER, #1<br>4. COLLECTOR, #1<br>5. COLLECTOR, #2<br>6. BASE, #2<br>7. EMITTER, #2<br>8. COLLECTOR, #2<br>9. COLLECTOR, #3<br>10. BASE, #3<br>11. EMITTER, #3<br>12. COLLECTOR, #3<br>13. COLLECTOR, #4<br>14. BASE, #4<br>15. EMITTER, #4<br>16. COLLECTOR, #4                                                                                         | STYLE 4:<br>PIN 1. COLLECTOR, DYE #1<br>2. COLLECTOR, #1<br>3. COLLECTOR, #2<br>4. COLLECTOR, #2<br>5. COLLECTOR, #3<br>6. COLLECTOR, #3<br>7. COLLECTOR, #4<br>8. COLLECTOR, #4<br>9. BASE, #4<br>10. EMITTER, #4<br>11. BASE, #3<br>12. EMITTER, #3<br>13. BASE, #2<br>14. EMITTER, #2<br>15. BASE, #1<br>16. EMITTER, #1 |
| STYLE 5:<br>PIN 1. DRAIN, DYE #1<br>2. DRAIN, #1<br>3. DRAIN, #2<br>4. DRAIN, #2<br>5. DRAIN, #3<br>6. DRAIN, #3<br>7. DRAIN, #4<br>8. DRAIN, #4<br>9. GATE, #4<br>10. SOURCE, #4<br>11. GATE, #3<br>12. SOURCE, #3<br>13. GATE, #2<br>14. SOURCE, #2<br>15. GATE, #1<br>16. SOURCE, #1 | STYLE 6:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. CATHODE<br>4. CATHODE<br>5. CATHODE<br>6. CATHODE<br>7. CATHODE<br>8. CATHODE<br>9. ANODE<br>10. ANODE<br>11. ANODE<br>12. ANODE<br>13. ANODE<br>14. ANODE<br>15. ANODE<br>16. ANODE                                 | STYLE 7:<br>PIN 1. SOURCE N-CH<br>2. COMMON DRAIN (OUTPUT)<br>3. COMMON DRAIN (OUTPUT)<br>4. GATE P-CH<br>5. COMMON DRAIN (OUTPUT)<br>6. COMMON DRAIN (OUTPUT)<br>7. COMMON DRAIN (OUTPUT)<br>8. SOURCE P-CH<br>9. SOURCE P-CH<br>10. COMMON DRAIN (OUTPUT)<br>11. COMMON DRAIN (OUTPUT)<br>12. COMMON DRAIN (OUTPUT)<br>13. GATE N-CH<br>14. COMMON DRAIN (OUTPUT)<br>15. COMMON DRAIN (OUTPUT)<br>16. SOURCE N-CH |                                                                                                                                                                                                                                                                                                                             |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |                                                                                                                                                                                     |
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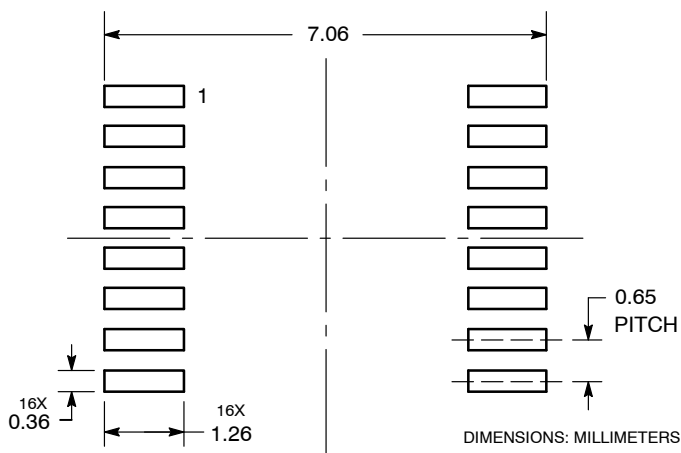

**TSSOP-16 WB**  
**CASE 948F**  
**ISSUE B**

DATE 19 OCT 2006

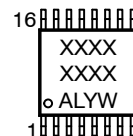

**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

| DIM | MILLIMETERS |      | INCHES    |       |
|-----|-------------|------|-----------|-------|
|     | MIN         | MAX  | MIN       | MAX   |
| A   | 4.90        | 5.10 | 0.193     | 0.200 |
| B   | 4.30        | 4.50 | 0.169     | 0.177 |
| C   | ---         | 1.20 | ---       | 0.047 |
| D   | 0.05        | 0.15 | 0.002     | 0.006 |
| F   | 0.50        | 0.75 | 0.020     | 0.030 |
| G   | 0.65 BSC    |      | 0.026 BSC |       |
| H   | 0.18        | 0.28 | 0.007     | 0.011 |
| J   | 0.09        | 0.20 | 0.004     | 0.008 |
| J1  | 0.09        | 0.16 | 0.004     | 0.006 |
| K   | 0.19        | 0.30 | 0.007     | 0.012 |
| K1  | 0.19        | 0.25 | 0.007     | 0.010 |
| L   | 6.40 BSC    |      | 0.252 BSC |       |
| M   | 0°          | 8°   | 0°        | 8°    |

**RECOMMENDED  
SOLDERING FOOTPRINT\***


\*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**GENERIC  
MARKING DIAGRAM\***


XXXX = Specific Device Code  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
G or ■ = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

|                         |                    |                                                                                                                                                                                  |
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