

Analog Multiplexers/ Demultiplexers with Injection Current Effect Control

Automotive Customized

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

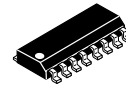
These devices are pin compatible to standard HC405x and MC1405xB analog mux/demux devices, but feature injection current effect control. This makes them especially suited for usage in automotive applications where voltages in excess of normal logic voltage are common.

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.

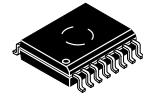
The devices utilize low power silicon gate CMOS technology. The Channel Select and Enable inputs are compatible with standard CMOS outputs.

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

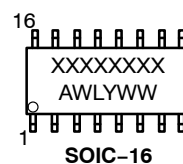


TSSOP-16
DT SUFFIX
CASE 948F

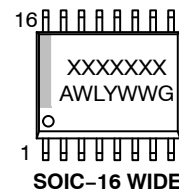


QFN16
MN SUFFIX
CASE 485AW

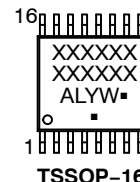
MARKING DIAGRAMS



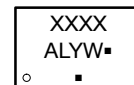
SOIC-16



SOIC-16 WIDE



TSSOP-16



QFN16*

*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

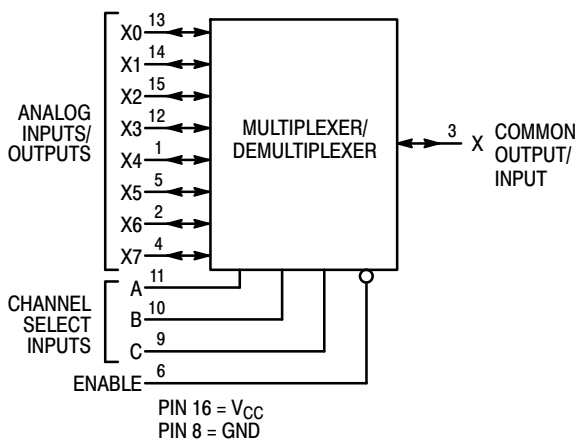


Figure 1. 4851A Logic Diagram
Single-Pole, 8-Position Plus Common Off

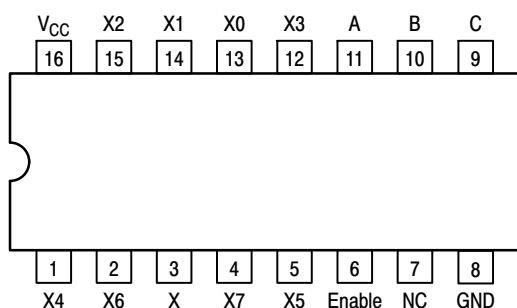


Figure 2. 4851A 16-Lead Pinout (Top View)

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 |

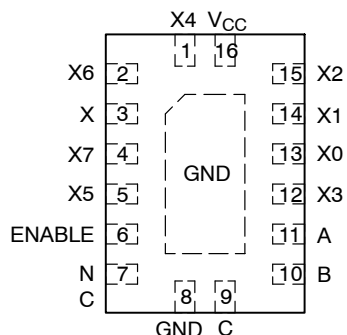


Figure 3. 4851A QFN Pinout

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

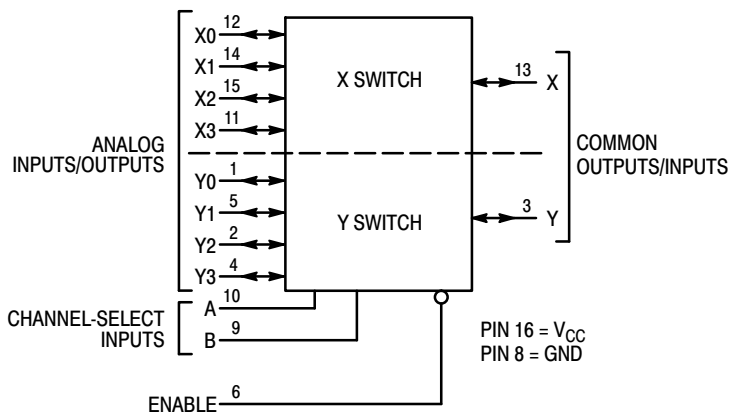


Figure 4. 4852A Logic Diagram
Double-Pole, 4-Position Plus Common Off

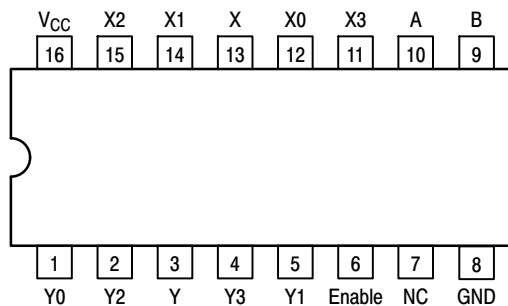


Figure 5. 4852A 16-Lead Pinout (Top View)

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit | |
|------------------|--|--|----------------------|------|
| V _{CC} | DC Supply Voltage | −0.5 to +6.5 | V | |
| V _{IN} | DC Input Voltage | −0.5 to V _{CC} +0.5 | V | |
| I _{IN} | DC Input Current, per Pin | ±25 | mA | |
| I _{CC} | DC Supply Current, V _{CC} and GND Pins | ±50 | mA | |
| I _{IK} | Input Clamp Current (V _{IN} < 0 or V _{IN} > V _{CC}) | ±20 | mA | |
| I _{OK} | Output Clamp Current (V _{OUT} < 0 or V _{OUT} > V _{CC}) | ±20 | mA | |
| T _{STG} | Storage Temperature Range | −65 to +150 | °C | |
| T _L | Lead Temperature, 1 mm from Case for 10 secs | 260 | °C | |
| T _J | Junction Temperature Under Bias | +150 | °C | |
| θ _{JA} | Thermal Resistance (Note 1) | SOIC−16 QFN16 TSSOP−16 | 126 118 159 | °C/W |
| P _D | Power Dissipation in Still Air at 25°C | SOIC−16 QFN16 TSSOP−16 | 995 1062 787 | mW |
| MSL | Moisture Sensitivity | Level 1 | − | |
| F _R | Flammability Rating | Oxygen Index: 28 to 34 | UL 94 V−0 @ 0.125 in | − |
| V _{ESD} | ESD Withstand Voltage (Note 2) | Human Body Model Charged Device Model | > 2000 N/A | 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 | $V_{CC} = 2.0\text{ V}$ $V_{CC} = 4.5\text{ V}$ $V_{CC} = 6.0\text{ V}$ | 0 1000 500 400 | 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 | $V_{CC} = 4.5\text{ V}$ | 0 500 | 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 _{CC} V | Guaranteed Limit | | | Unit |
|-----------------|---|--|--------------------------|------------------------------|------------------------------|------------------------------|------|
| | | | | -55 to 25°C | ≤85°C | ≤125°C | |
| V _{IH} | Minimum High-Level Input Voltage, Channel-Select or Enable Inputs | R _{on} = Per Spec | 2.0 3.0 4.5 6.0 | 1.50 2.10 3.15 4.20 | 1.50 2.10 3.15 4.20 | 1.50 2.10 3.15 4.20 | V |
| V _{IL} | Maximum Low-Level Input Voltage, Channel-Select or Enable Inputs | R _{on} = Per Spec | 2.0 3.0 4.5 6.0 | 0.50 0.90 1.35 1.80 | 0.50 0.90 1.35 1.80 | 0.50 0.90 1.35 1.80 | V |
| I _{in} | Maximum Input Leakage Current on Digital Pins (Enable/A/B/C) | 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(digital)} = V _{CC} or GND V _{in(analog)} = 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 _{CC} | Guaranteed Limit | | | Unit |
|------------------|---|--|--------------------------|----------------------------|----------------------------|----------------------------|------|
| | | | | -55 to 25°C | ≤85°C | ≤125°C | |
| R _{on} | Maximum "ON" Resistance | V _{in} = V _{IL} or V _{IH} ; V _{IS} = V _{CC} to GND (Note 4); I _S ≤ 2.0 mA (Note 5) | 2.0 3.0 4.5 6.0 | 1700 1100 550 400 | 1750 1200 650 500 | 1800 1300 750 600 | Ω |
| ΔR _{on} | Delta "ON" Resistance | V _{in} = V _{IL} or V _{IH} ; V _{IS} = V _{CC} /2 (Note 4); I _S ≤ 2.0 mA (Note 5) | 2.0 3.0 4.5 6.0 | 300 160 80 60 | 400 200 100 80 | 500 240 120 100 | Ω |
| I _{off} | Maximum Off-Channel Leakage Current, Any One Channel Common Channel | V _{in} = V _{CC} or GND | 6.0 | ±0.1 ±0.1 | ±0.1 ±0.1 | ±0.1 ±0.1 | μA |
| I _{on} | Maximum On-Channel Leakage Channel-to-Channel | V _{in} = V _{CC} 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_{IS} is the input voltage of an analog I/O pin.

5. I_S is the current flowing in or out of analog I/O pin.

AC CHARACTERISTICS (MC74HC4851A, MC74HC4852A) (C_L = 50 pF)

| Symbol | Parameter | V _{CC} | -55 to 25°C | ≤85°C | ≤125°C | Unit |
|--|---|--------------------------|------------------------|------------------------|-------------------------|------|
| t _{PHL} , t _{PLH} | Maximum Propagation Delay, Analog Input to Analog Output | 2.0 3.0 4.5 6.0 | 160 80 40 30 | 180 90 45 35 | 200 100 50 40 | ns |
| t _{PHL} , t _{PHZ,PZH} , t _{PLH} , t _{PLZ,PZL} | Maximum Propagation Delay, Enable or Channel-Select to Analog Output | 2.0 3.0 4.5 6.0 | 260 160 80 78 | 280 180 90 80 | 300 200 100 80 | ns |
| C _{in} | Maximum Input Capacitance (All Switches Off) Digital Pins (All Switches Off) Any Single Analog Pin Common Analog Pin | | 10 35 40 | 10 35 40 | 10 35 40 | pF |
| C _{PD} | Power Dissipation Capacitance 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 | $I_{in}^* \leq 1\text{ mA}$, $R_S \leq 3,9\text{ k}\Omega$ $I_{in}^* \leq 10\text{ mA}$, $R_S \leq 3,9\text{ k}\Omega$ $I_{in}^* \leq 1\text{ mA}$, $R_S \leq 20\text{ k}\Omega$ $I_{in}^* \leq 10\text{ mA}$, $R_S \leq 20\text{ k}\Omega$ | 0.1 1.0 0.5 5.0 | 1.0 5.0 2.0 20 | mV |

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

DC CHARACTERISTICS – Digital Section (MC74HCT4851A, MC74HCT4852A)

| Symbol | Parameter | Condition | V_{CC} V | Guaranteed Limit | | | Unit |
|----------|---|--|---------------|----------------------------------|-------------------------|--------------------------|---------------|
| | | | | $-55\text{ to }25^\circ\text{C}$ | $\leq 85^\circ\text{C}$ | $\leq 125^\circ\text{C}$ | |
| 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 | ± 0.1 | ± 1.0 | ± 1.0 | μA |
| I_{CC} | Maximum Quiescent Supply Current (per Package) | $V_{in(\text{digital})} = V_{CC}$ or GND $V_{in(\text{analog})} = \text{GND}$ | 5.5 | 2.0 | 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 (MC74HCT4851A, MC74HCT4852A)

| Symbol | Parameter | Condition | V_{CC} | Guaranteed Limit | | | Unit |
|-----------------|---|--|------------|----------------------------------|-------------------------|--------------------------|---------------|
| | | | | $-55\text{ to }25^\circ\text{C}$ | $\leq 85^\circ\text{C}$ | $\leq 125^\circ\text{C}$ | |
| 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 5.5 | 550 400 | 650 500 | 750 600 | Ω |
| ΔR_{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 5.5 | 80 60 | 100 80 | 120 100 | Ω |
| I_{off} | Maximum Off-Channel Leakage Current, Any One Channel Common Channel | $V_{in} = V_{CC}$ or GND | 5.5 | ± 0.1 ± 0.1 | ± 0.1 ± 0.1 | ± 0.1 ± 0.1 | μA |
| I_{on} | Maximum On-Channel Leakage Channel-to-Channel | $V_{in} = V_{CC}$ or GND | 5.5 | ± 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.

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

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

| Symbol | Parameter | V_{CC} | -55 to 25°C | ≤85°C | ≤125°C | Unit |
|--|---|----------|----------------|----------------|----------------|------|
| t_{PHL} , t_{PLH} | Maximum Propagation Delay, Analog Input to Analog Output | 5.0 | 40 | 45 | 50 | ns |
| t_{PHL} , $t_{PHZ,PZH}$, t_{PLH} , $t_{PLZ,PZL}$ | Maximum Propagation Delay, Enable or Channel-Select to Analog Output | 5.0 | 80 | 90 | 100 | ns |
| C_{in} | Maximum Input Capacitance Digital Pins (All Switches Off) Any Single Analog Pin (All Switches Off) Common Analog Pin | | 10 35 40 | 10 35 40 | 10 35 40 | pF |
| C_{PD} | Power Dissipation Capacitance 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 | $I_{in}^* \leq 1 \text{ mA}$, $R_S \leq 3.9 \text{ k}\Omega$ $I_{in}^* \leq 10 \text{ mA}$, $R_S \leq 3.9 \text{ k}\Omega$ $I_{in}^* \leq 1 \text{ mA}$, $R_S \leq 20 \text{ k}\Omega$ $I_{in}^* \leq 10 \text{ mA}$, $R_S \leq 20 \text{ k}\Omega$ | 0.1 1.0 0.5 5.0 | 1.0 5.0 2.0 20 | mV |

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

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

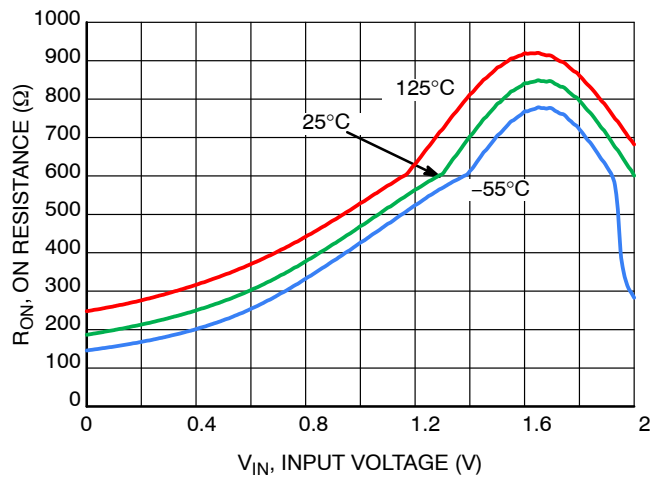


Figure 6. Typical On Resistance $V_{CC} = 2\text{ V}$

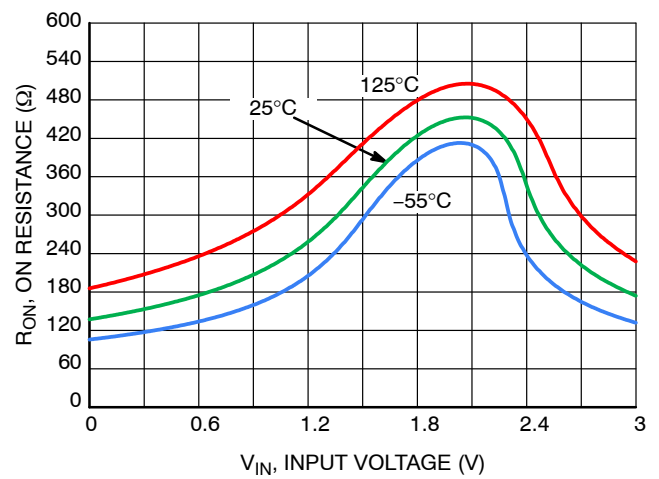


Figure 7. Typical On Resistance $V_{CC} = 3\text{ V}$

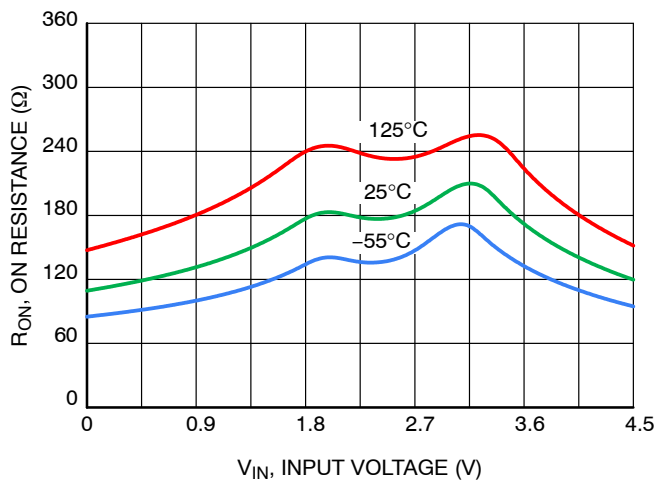


Figure 8. Typical On Resistance $V_{CC} = 4.5\text{ V}$

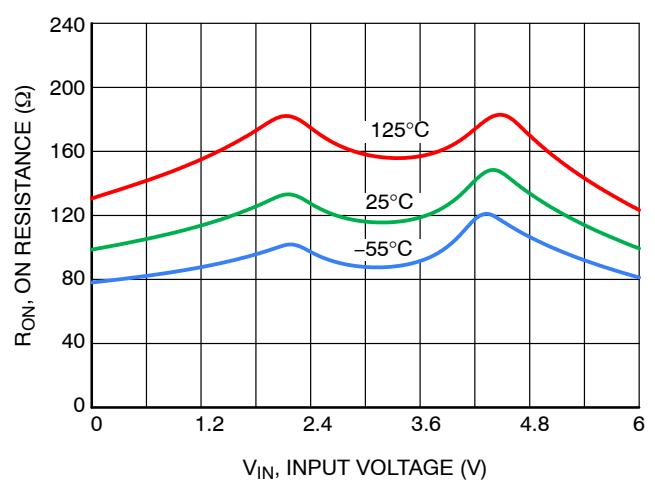


Figure 9. Typical On Resistance $V_{CC} = 6\text{ V}$

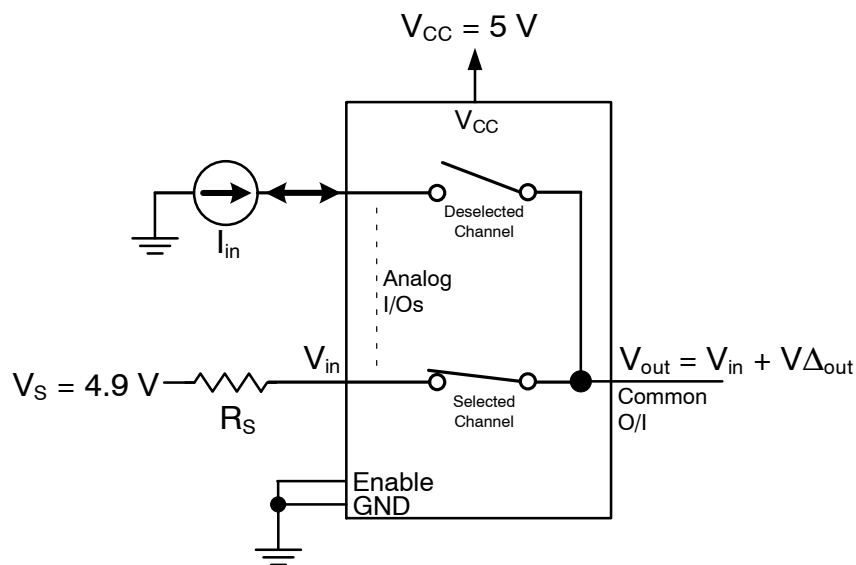


Figure 10. Injection Current Coupling Specification

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

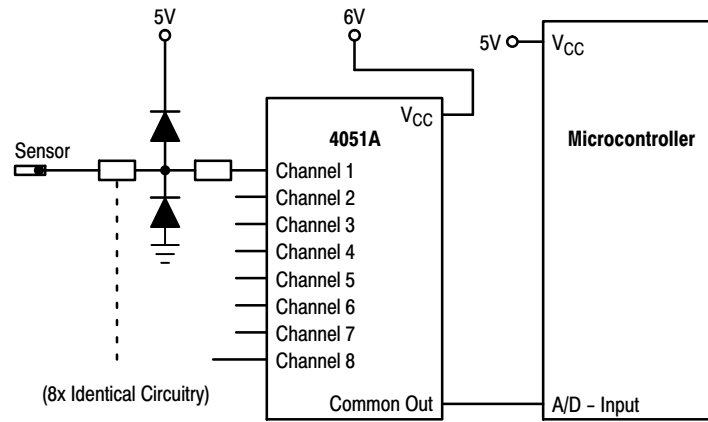


Figure 11. Actual Technology

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

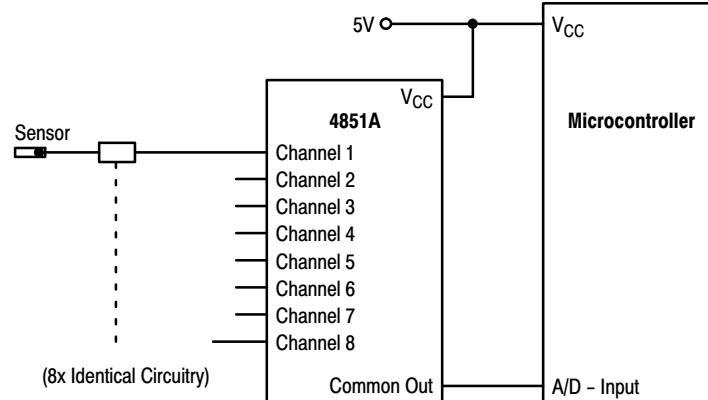


Figure 12. 4851A Solution

Solution by applying the 4851A multiplexer

TEST SETUPS

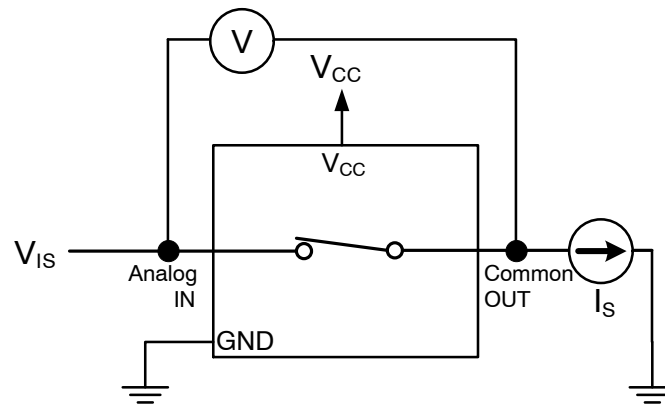


Figure 13. On Resistance

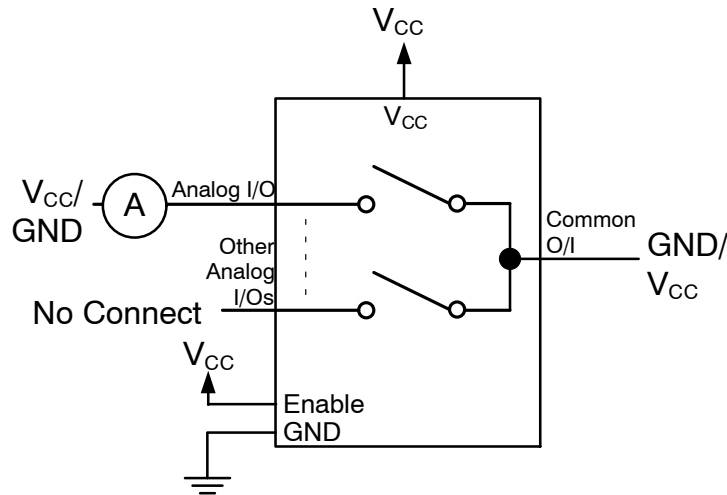


Figure 14. Maximum Off Channel Leakage Current, Any One Channel

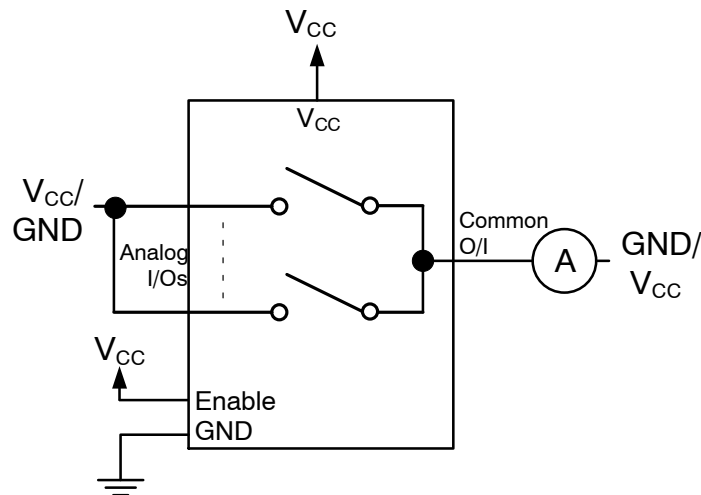


Figure 15. Maximum Off Channel Leakage Current, Common Channel

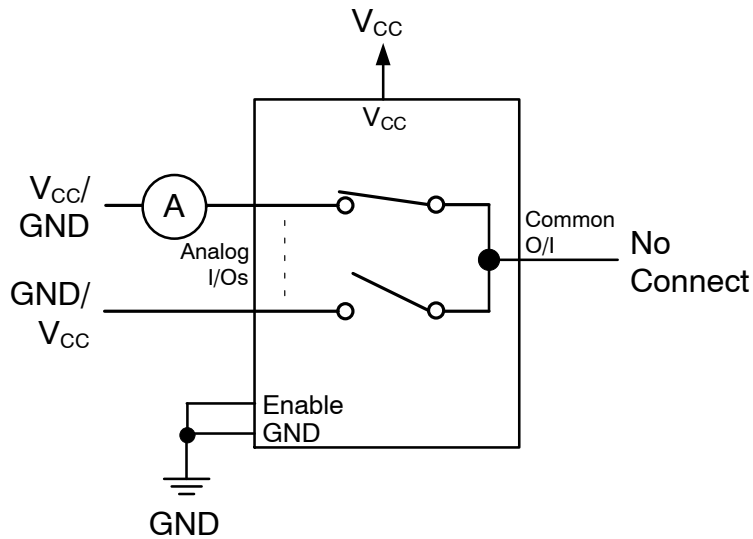
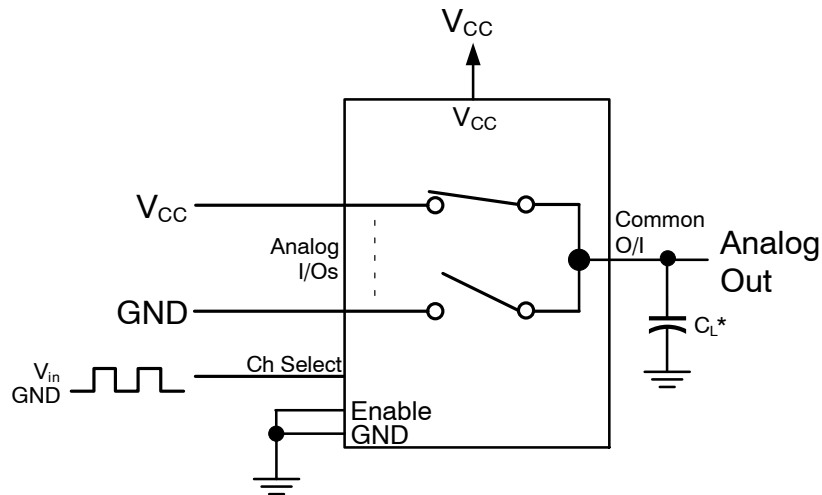
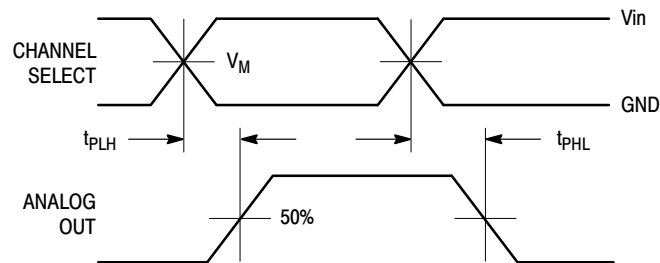


Figure 16. Maximum On Channel Leakage Current, Channel to Channel



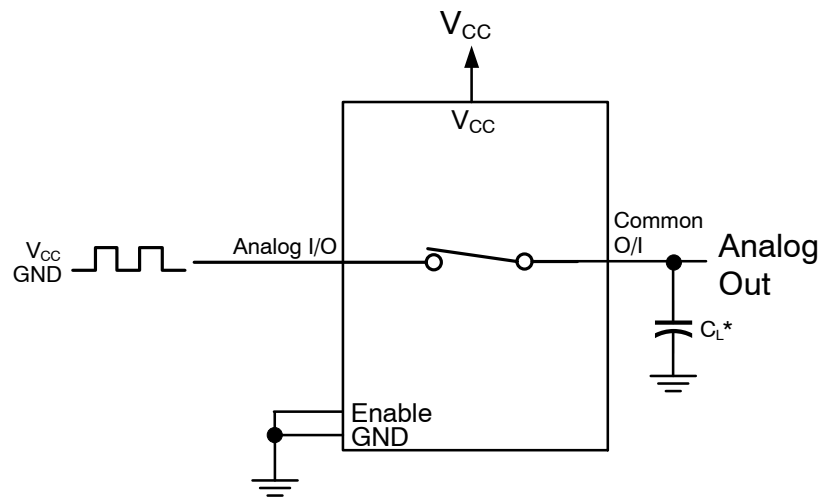
*Includes all probe and jig capacitance.



$V_{in} = V_{cc}$ 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

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A



*Includes all probe and jig capacitance.

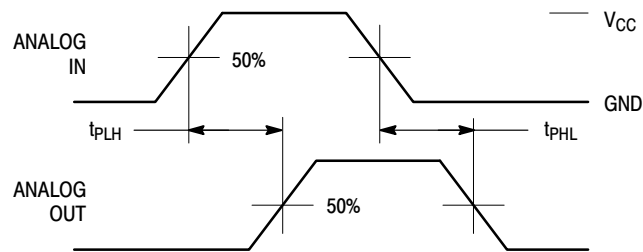
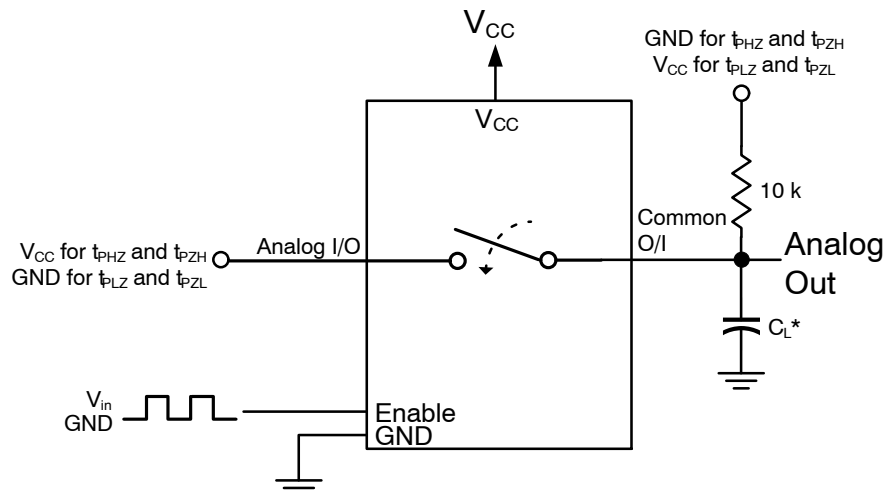


Figure 18. Propagation Delay, Analog In to Analog Out



*Includes all probe and jig capacitance.

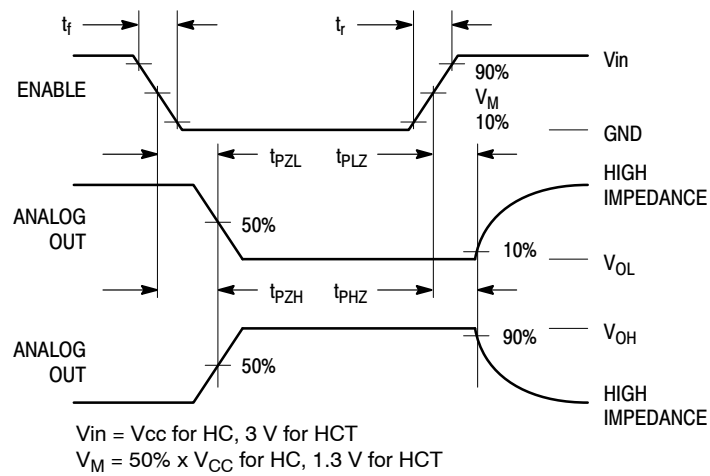


Figure 19. Propagation Delay, Enable to Analog Out

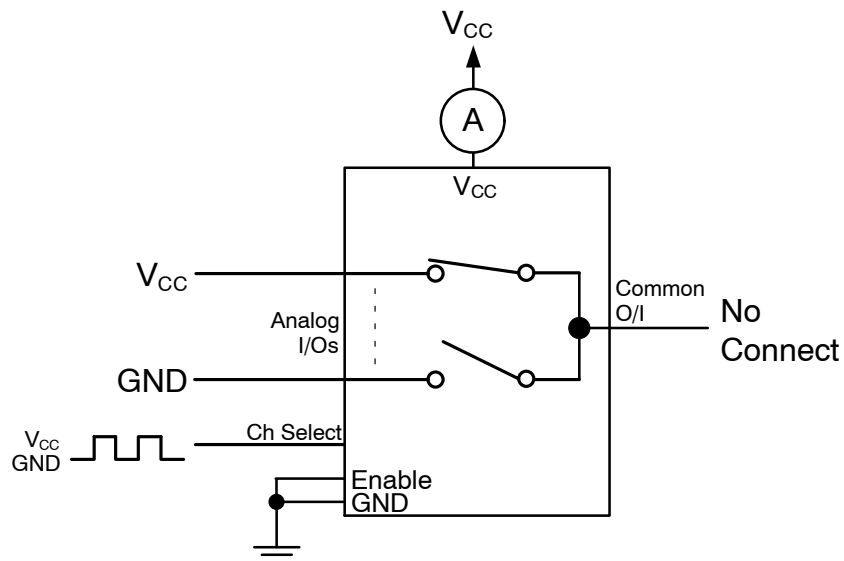


Figure 20. Power Dissipation Capacitance

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

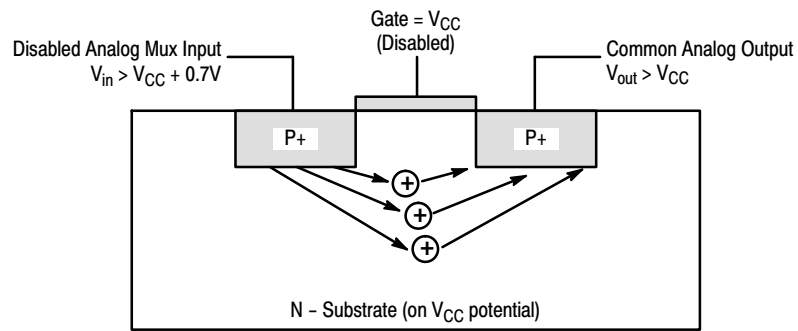


Figure 21. Diagram of Bipolar Coupling Mechanism
Appears if V_{in} exceeds V_{CC} , driving injection current into the substrate

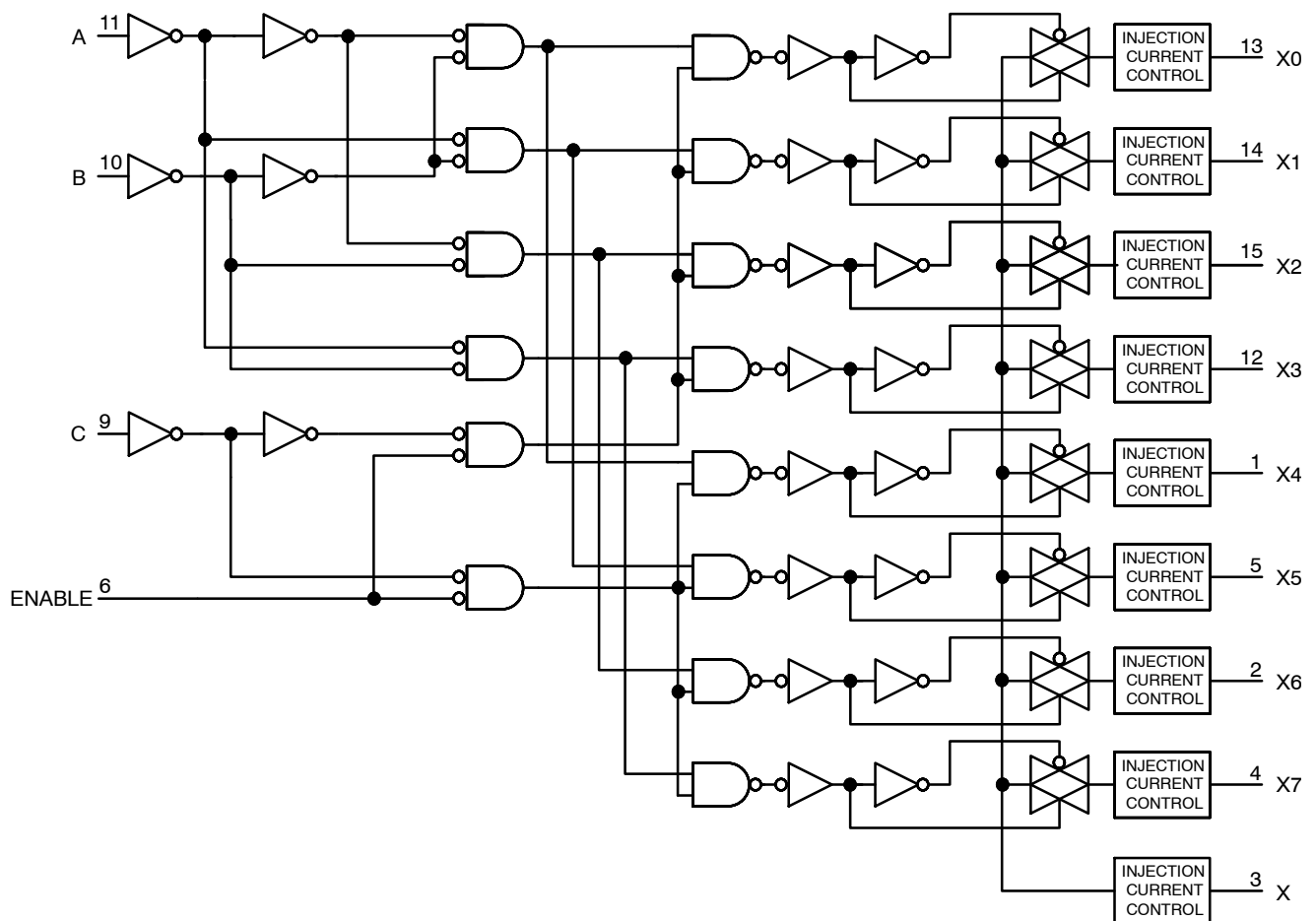


Figure 22. Function Diagram, 4851A

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

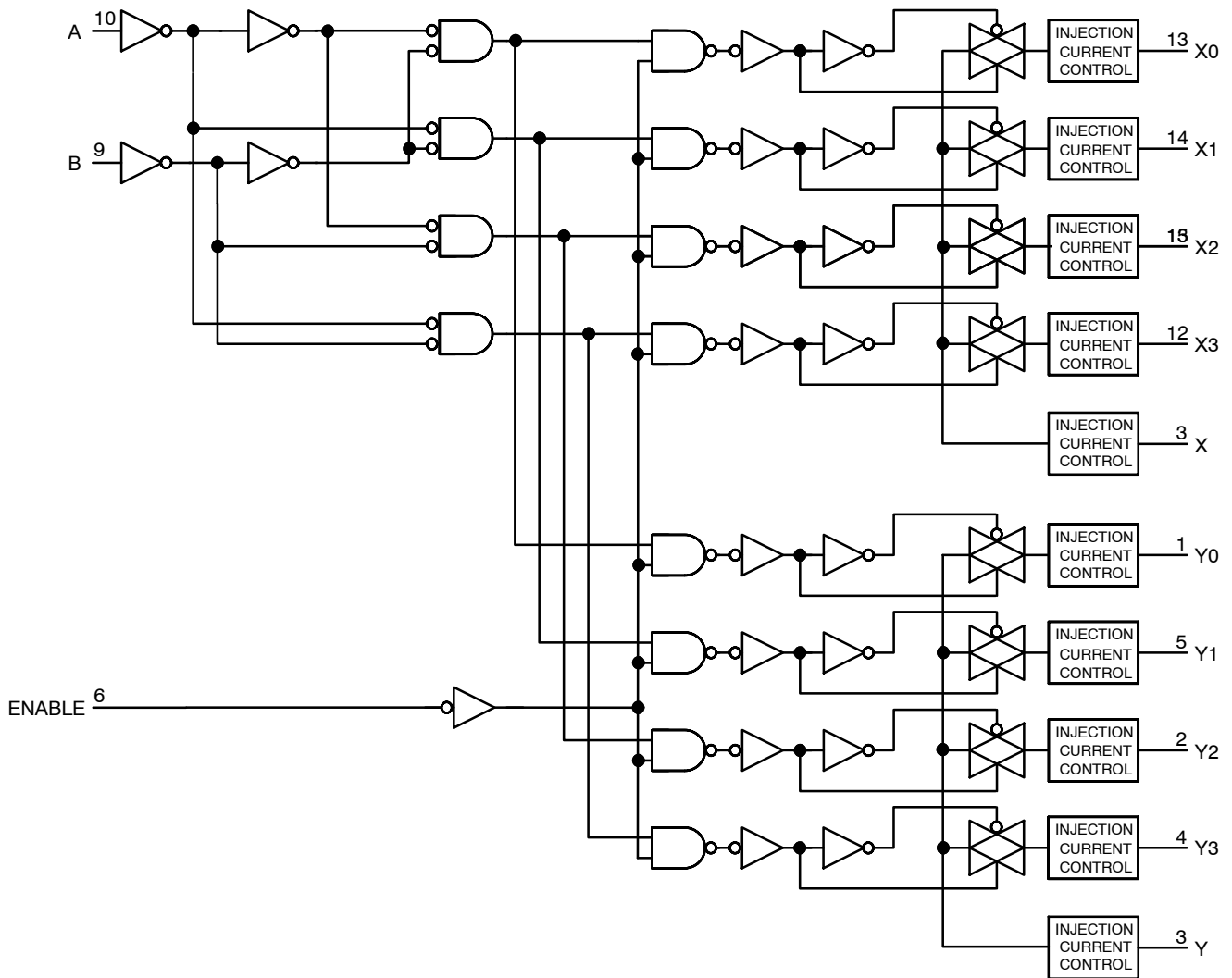


Figure 23. Function Diagram, 4852A

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

ORDERING INFORMATION

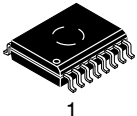
| Device | Marking | Package | Shipping [†] |
|----------------------|--------------|----------|-----------------------|
| MC74HC4851ADG | HC4851AG | SOIC-16 | 55 Units / Rail |
| MC74HC4851ADR2G | HC4851AG | SOIC-16 | 2500 / Tape & Reel |
| MC74HC4851ADR2G-Q* | HC4851AG | SOIC-16 | 2500 / Tape & Reel |
| MC74HC4851ADTR2G | HC48 51A | TSSOP-16 | 2500 / Tape & Reel |
| MC74HC4851ADTR2G-Q* | HC48 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 52A | TSSOP-16 | 2500 / Tape & Reel |
| MC74HC4852ADTR2G-Q* | HC48 52A | TSSOP-16 | 2500 / Tape & Reel |
| MC74HCT4851ADR2G | HCT4851AG | SOIC-16 | 2500 / Tape & Reel |
| MC74HCT4851ADTR2G | HCT4 851A | TSSOP-16 | 2500 / Tape & Reel |
| MC74HCT4851ADTR2G-Q* | HCT4 851A | TSSOP-16 | 2500 / Tape & Reel |
| MC74HCT4852ADR2G | HCT4852AG | SOIC-16 | 2500 / Tape & Reel |
| MC74HCT4852ADTR2G | HCT4 852A | TSSOP-16 | 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.

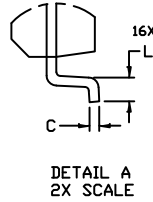
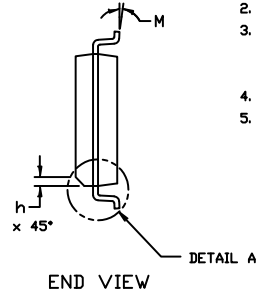
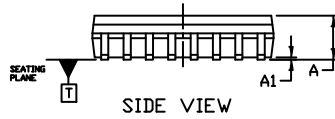
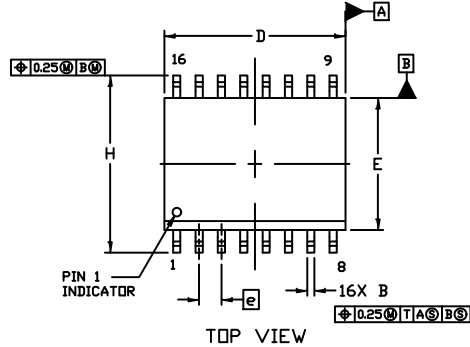
*-Q Suffix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

MC74HC4851A, MC74HC4852A, MC74HCT4851A, MC74HCT4852A

PACKAGE DIMENSIONS



SCALE 1:1

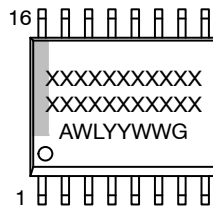


NOTES:

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.

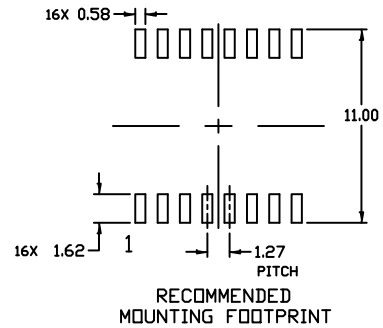
| DIM | MILLIMETERS | |
|-----|-------------|-------|
| | MIN. | MAX. |
| A | 2.35 | 2.65 |
| A1 | 0.10 | 0.25 |
| B | 0.35 | 0.49 |
| C | 0.23 | 0.32 |
| D | 10.15 | 10.45 |
| E | 7.40 | 7.60 |
| e | 1.27 BSC | |
| H | 10.05 | 10.55 |
| h | 0.53 REF | |
| L | 0.50 | 0.90 |
| M | 0° | 7° |

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

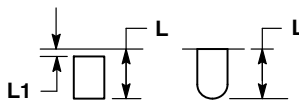
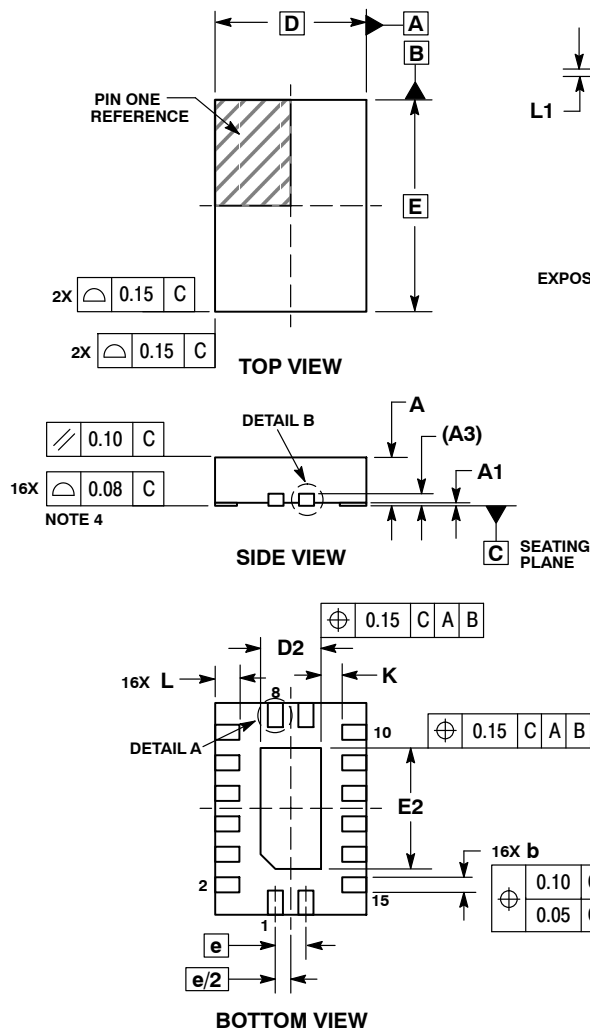
PACKAGE DIMENSIONS



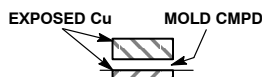
SCALE 2:1

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

DATE 11 DEC 2008



DETAIL A
ALTERNATE TERMINAL
CONSTRUCTIONS



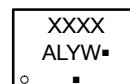
DETAIL B
ALTERNATE
CONSTRUCTIONS

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*

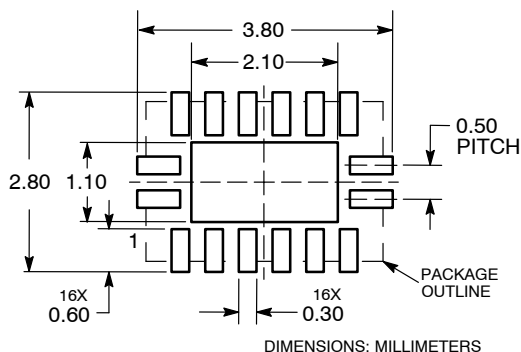


- XXXX = Specific Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

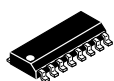
*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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.

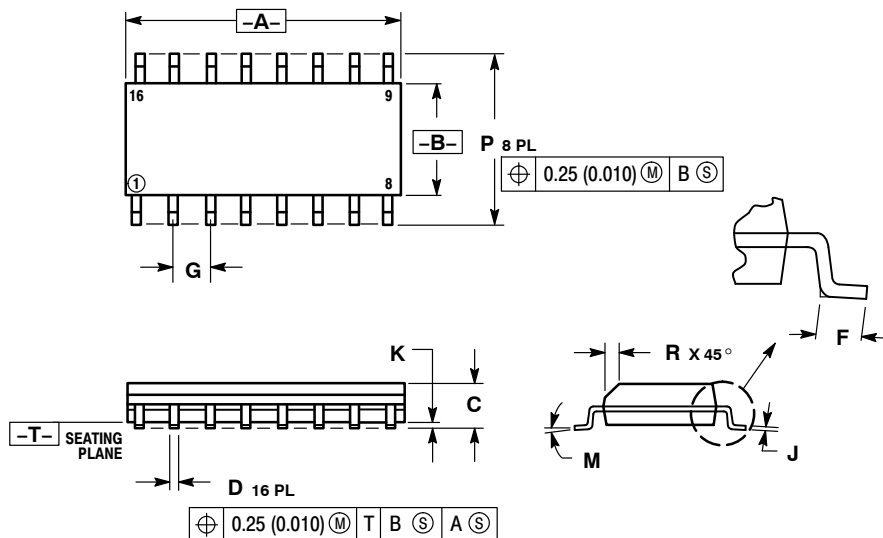
MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 1:1

SOIC-16 CASE 751B-05 ISSUE K

DATE 29 DEC 2006



NOTES:

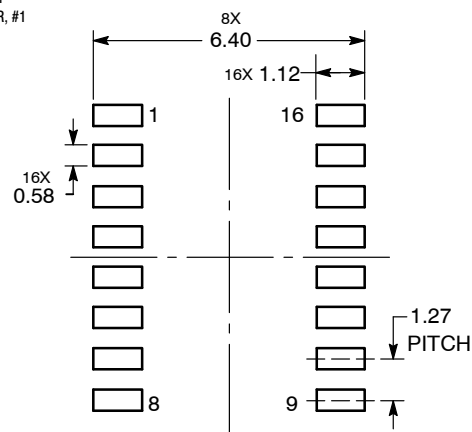
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

| | | | |
|-------------------|-------------------|--------------------------|--------------------------|
| STYLE 1: | STYLE 2: | STYLE 3: | STYLE 4: |
| PIN 1. COLLECTOR | PIN 1. CATHODE | PIN 1. COLLECTOR, DYE #1 | PIN 1. COLLECTOR, DYE #1 |
| 2. BASE | 2. ANODE | 2. BASE, #1 | 2. COLLECTOR, #1 |
| 3. EMITTER | 3. NO CONNECTION | 3. EMITTER, #1 | 3. COLLECTOR, #2 |
| 4. NO CONNECTION | 4. CATHODE | 4. COLLECTOR, #1 | 4. COLLECTOR, #2 |
| 5. EMITTER | 5. CATHODE | 5. COLLECTOR, #2 | 5. COLLECTOR, #3 |
| 6. BASE | 6. NO CONNECTION | 6. BASE, #2 | 6. COLLECTOR, #3 |
| 7. COLLECTOR | 7. ANODE | 7. EMITTER, #2 | 7. COLLECTOR, #4 |
| 8. COLLECTOR | 8. CATHODE | 8. COLLECTOR, #2 | 8. COLLECTOR, #4 |
| 9. BASE | 9. CATHODE | 9. COLLECTOR, #3 | 9. BASE, #4 |
| 10. EMITTER | 10. ANODE | 10. BASE, #3 | 10. EMITTER, #4 |
| 11. NO CONNECTION | 11. NO CONNECTION | 11. EMITTER, #3 | 11. BASE, #3 |
| 12. EMITTER | 12. CATHODE | 12. COLLECTOR, #3 | 12. EMITTER, #3 |
| 13. BASE | 13. CATHODE | 13. COLLECTOR, #4 | 13. BASE, #2 |
| 14. COLLECTOR | 14. NO CONNECTION | 14. BASE, #4 | 14. EMITTER, #2 |
| 15. EMITTER | 15. ANODE | 15. EMITTER, #4 | 15. BASE, #1 |
| 16. COLLECTOR | 16. CATHODE | 16. COLLECTOR, #4 | 16. EMITTER, #1 |

| | | |
|----------------------|----------------|---------------------------|
| STYLE 5: | STYLE 6: | STYLE 7: |
| PIN 1. DRAIN, DYE #1 | PIN 1. CATHODE | PIN 1. SOURCE N-CH |
| 2. DRAIN, #1 | 2. CATHODE | 2. COMMON DRAIN (OUTPUT) |
| 3. DRAIN, #2 | 3. CATHODE | 3. COMMON DRAIN (OUTPUT) |
| 4. DRAIN, #2 | 4. CATHODE | 4. GATE P-CH |
| 5. DRAIN, #3 | 5. CATHODE | 5. COMMON DRAIN (OUTPUT) |
| 6. DRAIN, #3 | 6. CATHODE | 6. COMMON DRAIN (OUTPUT) |
| 7. DRAIN, #4 | 7. CATHODE | 7. COMMON DRAIN (OUTPUT) |
| 8. DRAIN, #4 | 8. CATHODE | 8. SOURCE P-CH |
| 9. GATE, #4 | 9. ANODE | 9. SOURCE P-CH |
| 10. SOURCE, #4 | 10. ANODE | 10. COMMON DRAIN (OUTPUT) |
| 11. GATE, #3 | 11. ANODE | 11. COMMON DRAIN (OUTPUT) |
| 12. SOURCE, #3 | 12. ANODE | 12. COMMON DRAIN (OUTPUT) |
| 13. GATE, #2 | 13. ANODE | 13. GATE N-CH |
| 14. SOURCE, #2 | 14. ANODE | 14. COMMON DRAIN (OUTPUT) |
| 15. GATE, #1 | 15. ANODE | 15. COMMON DRAIN (OUTPUT) |
| 16. SOURCE, #1 | 16. ANODE | 16. SOURCE N-CH |

RECOMMENDED SOLDERING FOOTPRINT*



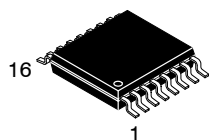
DIMENSIONS: MILLIMETERS

*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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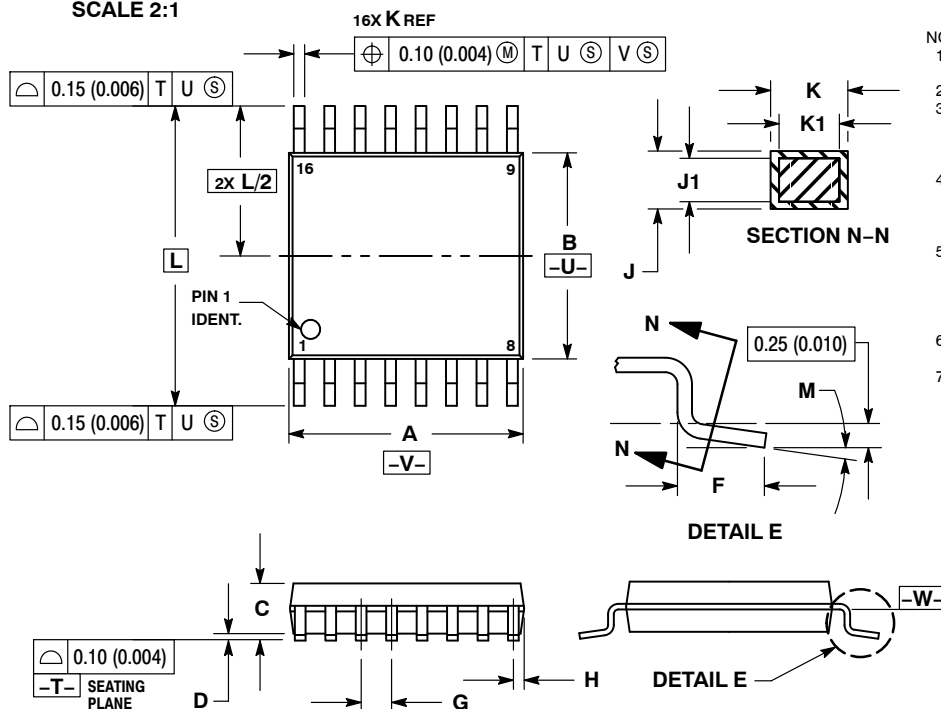
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MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



TSSOP-16 WB
CASE 948F
ISSUE B

DATE 19 OCT 2006

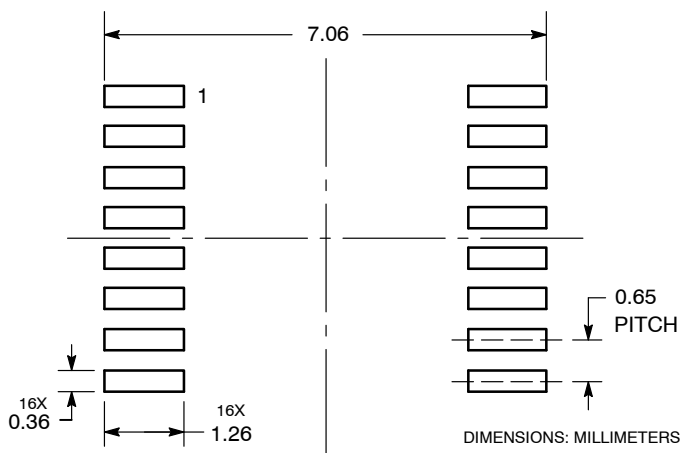


NOTES:

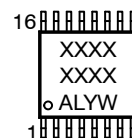
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD 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*



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.

*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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