

# Analog Multiplexer/ Demultiplexer

## High-Performance Silicon-Gate CMOS

### MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053

These devices utilize silicon-gate CMOS technology to achieve fast propagation delays, low ON resistances, and low leakage currents. This analog multiplexer/demultiplexer controls analog voltages that may vary across the complete power supply range (from  $V_{CC}$  to  $V_{EE}$ ).

The devices are similar in pinout to the LVX805n, the HC405nA, and the metal-gate MC1405nB. The Channel-Select inputs determine which one of the Analog Inputs/Outputs is to be connected, by means of an analog switch, to the Common Output/Input. When the Enable pin is HIGH, all analog switches are turned off.

The Channel-Select and Enable inputs are compatible with standard CMOS outputs. These inputs are overvoltage tolerant (OVT) for level translation from 6.0 V down to 3.0 V.

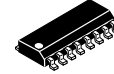
This device has been designed so the ON resistance ( $R_{ON}$ ) is more linear over input voltage than the  $R_{ON}$  of metal-gate CMOS analog switches and High-Speed CMOS analog switches.

#### Features

- Fast Switching and Propagation Speeds
- Low Crosstalk Between Switches
- Analog Power Supply Range ( $V_{CC} - V_{EE}$ ) = -3.0 V to +3.0 V
- Digital (Control) Power Supply Range ( $V_{CC} - GND$ ) = 2.5 to 6.0 V
- Improved Linearity and Lower ON Resistance Than Metal-Gate, HSL, or VHC Counterparts
- Low Noise
- Designed to Operate on a Single Supply with  $V_{EE} = GND$ , or Using Split Supplies up to  $\pm 3.0$  V
- Break-Before-Make Circuitry
- -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



QFN16  
MN SUFFIX  
CASE 485AW

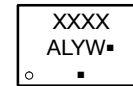


SOIC-16  
D SUFFIX  
CASE 751B

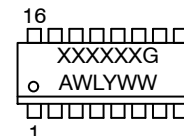


TSSOP-16  
DT SUFFIX  
CASE 948F

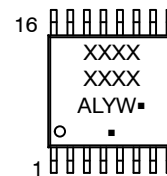
#### MARKING DIAGRAMS



QFN16



SOIC-16



TSSOP-16

- XXXXXX = Specific Device Code
- A = Assembly Location
- WL, L = Wafer Lot
- 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 in the package dimensions section on page 16 of this data sheet.

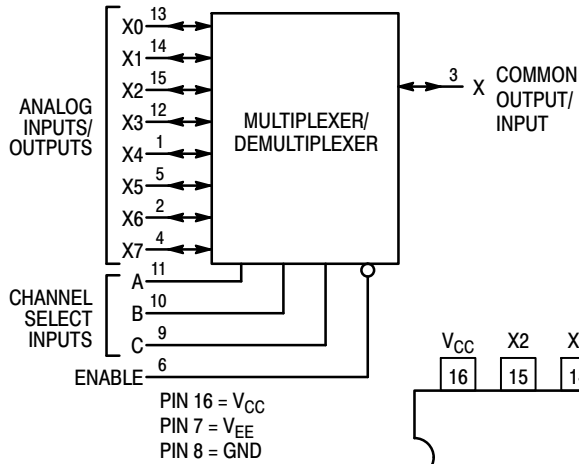
**MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053**

**FUNCTION TABLE - 4051**

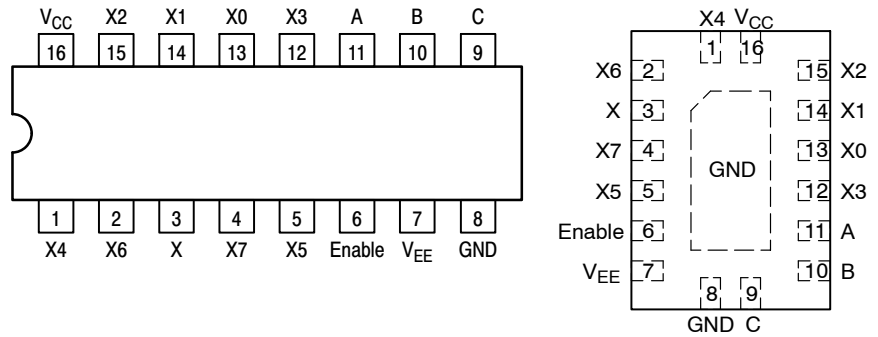
Control Inputs				ON Channels
Enable	Select			
	C	B	A	
L	L	L	L	X0
L	L	L	H	X1
L	L	H	L	X2
L	L	H	H	X3
L	H	L	L	X4
L	H	L	H	X5
L	H	H	L	X6
L	H	H	H	X7
H	X	X	X	NONE

X = Don't Care

**LOGIC DIAGRAM  
4051  
Single-Pole, 8-Position Plus Common Off**



**Pinouts: 4051 (Top View)**

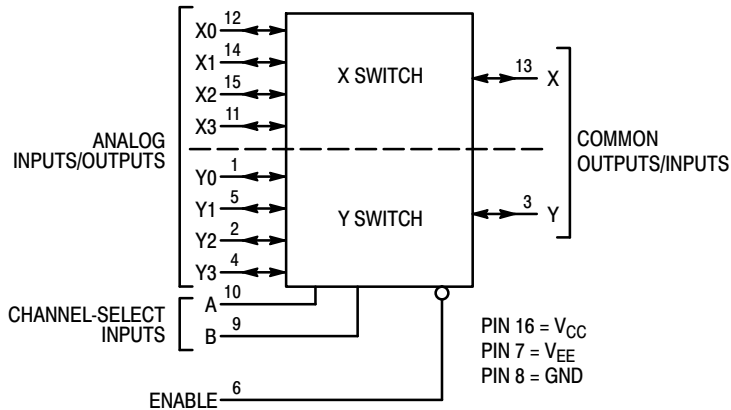


**FUNCTION TABLE - 4052**

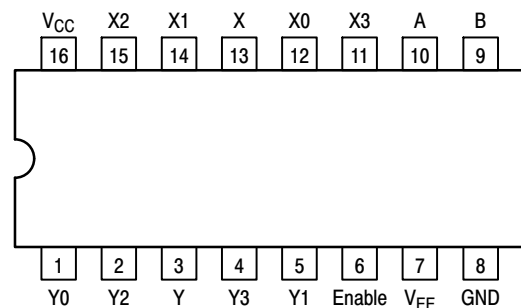
Control Inputs			ON Channels	
Enable	Select			
	B	A		
L	L	L	Y0	X0
L	L	H	Y1	X1
L	H	L	Y2	X2
L	H	H	Y3	X3
H	X	X	NONE	

X = Don't Care

**LOGIC DIAGRAM  
4052  
Double-Pole, 4-Position Plus Common Off**

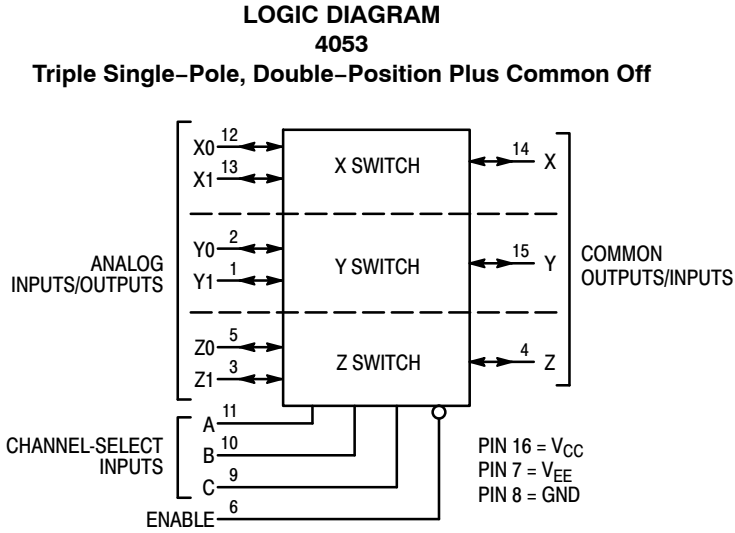


**Pinout: 4052 (Top View)**



**MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053**

**FUNCTION TABLE – 4053**

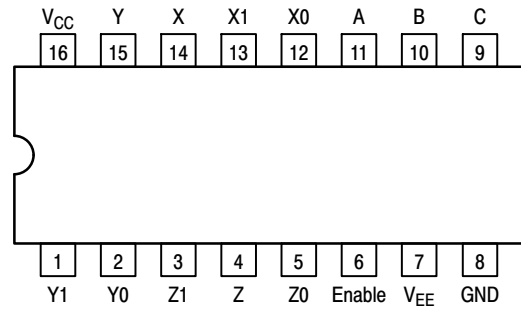


NOTE: This device allows independent control of each switch. Channel-Select Input A controls the X-Switch, Input B controls the Y-Switch and Input C controls the Z-Switch

Control Inputs		ON Channels				
Enable	Select					
	C	B	A	Z0	Y0	X0
L	L	L	L	Z0	Y0	X0
L	L	L	H	Z0	Y0	X1
L	L	H	L	Z0	Y1	X0
L	L	H	H	Z0	Y1	X1
L	H	L	L	Z1	Y0	X0
L	H	L	H	Z1	Y0	X1
L	H	H	L	Z1	Y1	X0
L	H	H	H	Z1	Y1	X1
H	X	X	X	NONE		

X = Don't Care

**Pinout: 4053 (Top View)**



# MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053

## MAXIMUM RATINGS (Voltages referenced to GND unless otherwise specified)

Symbol	Parameter	Value	Unit	
$V_{CC}$	Positive DC Supply Voltage	-0.5 to +6.5	V	
$V_{CC} - V_{EE}$	DC Supply Voltage	-0.5 to +6.5	V	
$V_{IS}$	Analog Input Voltage	$V_{EE} - 0.5$ to $V_{CC} + 0.5$	V	
$V_{IN}$	Digital Input Voltage (Referenced to $V_{EE}$ )	-0.5 to +6.5	V	
I	DC Current, into or out of any pin	$\pm 50$	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	
$\theta_{JA}$	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: 30% to 35%	UL 94 V-0 @ 0.125 in	-	
$V_{ESD}$	ESD Withstand Voltage (Note 2)	Human Body Model Charged Device Model	> 2000 > 1000	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 (Voltages referenced to GND unless otherwise specified)

Symbol	Parameter	Min	Max	Unit
$V_{CC}$	Positive DC Supply Voltage	2.5	6.0	V
$V_{EE}$	Negative DC Supply Voltage	-3.5	GND	V
$V_{CC} - V_{EE}$	DC Supply Voltage	2.5	6.0	V
$V_{IS}$	Analog Input Voltage	$V_{EE}$	$V_{CC}$	V
$V_{IN}$	Digital Input Voltage (Note 3) (Referenced to $V_{EE}$ )	0	6.0	V
$T_A$	Operating Temperature Range	-55	+125	°C
$t_r, t_f$	Input Transition Rise or Fall Time (Channel Select or Enable Inputs)	$V_{CC} = 3.0 \text{ V} \pm 0.3 \text{ V}$ $V_{CC} = 5.0 \text{ V} \pm 0.5 \text{ V}$	0 100	ns/V

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.

# MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053

## DC CHARACTERISTICS – Digital Section (Voltages Referenced to GND)

Symbol	Parameter	Condition	V <sub>CC</sub> V	Guaranteed Limit			Unit
				-55 to 25°C	≤85°C	≤125°C	
<b>MC74LVX</b>							
V <sub>IH</sub>	Minimum High-Level Input Voltage, Channel-Select or Enable Inputs		2.5 3.0 4.5 6.0	1.90 2.10 3.15 4.2	1.90 2.10 3.15 4.2	1.90 2.10 3.15 4.2	V
V <sub>IL</sub>	Maximum Low-Level Input Voltage, Channel-Select or Enable Inputs		2.5 3.0 4.5 6.0	0.6 0.9 1.35 1.8	0.6 0.9 1.35 1.8	0.6 0.9 1.35 1.8	V
I <sub>IN</sub>	Maximum Input Leakage Current, Channel-Select or Enable Inputs	V <sub>IN</sub> = 6.0 or GND	0 V to 6.0 V	±0.1	±1.0	±1.0	μA
I <sub>CC</sub>	Maximum Quiescent Supply Current (per Package)	Channel Select, Enable and V <sub>IS</sub> = V <sub>CC</sub> or GND	6.0	4.0	40	80	μA

### MC74LVXT

V <sub>IH</sub>	Minimum High-Level Input Voltage, Channel-Select or Enable Inputs		3.0 4.5 5.5	2.0 2.0 2.0	2.0 2.0 2.0	2.0 2.0 2.0	V
V <sub>IL</sub>	Maximum Low-Level Input Voltage, Channel-Select or Enable Inputs		3.0 4.5 5.5	0.5 0.8 0.8	0.5 0.8 0.8	0.5 0.8 0.8	V
I <sub>IN</sub>	Maximum Input Leakage Current, Channel-Select or Enable Inputs	V <sub>IN</sub> = 6.0 or GND	0 V to 6.0 V	±0.1	±1.0	±1.0	μA
I <sub>CC</sub>	Maximum Quiescent Supply Current (per Package)	Channel Select, Enable and V <sub>IS</sub> = V <sub>CC</sub> or GND	6.0	4.0	40	80	μA

## DC ELECTRICAL CHARACTERISTICS – Analog Section

Symbol	Parameter	Test Conditions	V <sub>CC</sub> V	V <sub>EE</sub> V	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> = ½ (V <sub>CC</sub> + V <sub>EE</sub> )  I <sub>S</sub>   = 2.0 mA (Figure 1)	3.0 4.5 3.0	0 0 -3.0	86 37 26	108 46 33	120 55 37	Ω
ΔR <sub>ON</sub>	Maximum Difference in "ON" Resistance Between Any Two Channels in the Same Package	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> V <sub>IS</sub> = ½ (V <sub>CC</sub> + V <sub>EE</sub> )  I <sub>S</sub>   = 2.0 mA	3.0 4.5 3.0	0 0 -3.0	15 13 10	20 18 15	20 18 15	Ω
I <sub>off</sub>	Maximum Off-Channel Leakage Current, Any One Channel	V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; V <sub>IO</sub> = V <sub>CC</sub> or V <sub>EE</sub> ; Switch Off (Figure 2)	5.5 +3.0	0 -3.0	0.1 0.1	0.5 0.5	1.0 1.0	μA
	Maximum Off-Channel Leakage Current, Common Channel	V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; V <sub>IO</sub> = V <sub>CC</sub> or V <sub>EE</sub> ; Switch Off (Figure 3)	5.5 +3.0	0 -3.0	0.2 0.2	2.0 2.0	4.0 4.0	
I <sub>on</sub>	Maximum On-Channel Leakage Current, Channel-to-Channel	V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub> ; Switch-to-Switch = V <sub>CC</sub> or V <sub>EE</sub> ; (Figure 4)	5.5 +3.0	0 -3.0	0.2 0.2	2.0 2.0	4.0 4.0	μA

### AC CHARACTERISTICS (Input t<sub>r</sub> = t<sub>f</sub> = 3 ns)

Symbol	Parameter	Test Conditions	V <sub>CC</sub> V	V <sub>EE</sub> V	Guaranteed Limit				Unit
					-55 to 25°C		≤85°C	≤125°C	
					Min	Typ*			
t <sub>BMM</sub>	Minimum Break-Before-Make Time	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> V <sub>IS</sub> = V <sub>CC</sub> R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF (Figures 9 and 10)	3.0 4.5 3.0	0.0 0.0 -3.0	1.0 1.0 1.0	6.5 5.0 3.5	- - -	- - -	ns

\*Typical Characteristics are at 25°C.

**MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052,  
MC74LVXT4053**

**AC CHARACTERISTICS** ( $C_L = 50$  pF, Input  $t_r = t_f = 3$  ns)

Symbol	Parameter	V <sub>CC</sub> V	V <sub>EE</sub> V	Guaranteed Limit						Unit	
				-55 to 25°C			≤85°C		≤125°C		
				Min	Typ	Max	Min	Max	Min		Max
t <sub>PLH</sub> , t <sub>PHL</sub>	Maximum Propagation Delay, Channel-Select to Analog Output (Figures 11 and 12)	2.5	0			40		45		50	ns
		3.0	0			28		30		35	
		4.5	0			23		25		30	
		3.0	-3.0			23		25		28	
t <sub>PLZ</sub> , t <sub>PHZ</sub>	Maximum Propagation Delay, Enable to Analog Output (Figures 13 and 14)	2.5	0			40		45		50	ns
		3.0	0			28		30		35	
		4.5	0			23		25		30	
		3.0	-3.0			23		25		28	
t <sub>PZL</sub> , t <sub>PZH</sub>	Maximum Propagation Delay, Enable to Analog Output (Figures 13 and 14)	2.5	0			40		45		50	ns
		3.0	0			28		30		35	
		4.5	0			23		25		30	
		3.0	-3.0			23		25		28	
C <sub>PD</sub>	Power Dissipation Capacitance (Figure 15) (Note 4)	Typical @ 25°C, V <sub>CC</sub> = 5.0 V, V <sub>EE</sub> = 0 V						pF			
		45									
C <sub>IN</sub>	Maximum Input Capacitance, Channel-Select or Enable Inputs	10						pF			
C <sub>I/O</sub>	Maximum Capacitance (All Switches Off)			Analog I/O		10		pF			
				Common O/I		10					
				Feedthrough		1.0					

4. Used to determine the no-load dynamic power consumption:  $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$ .

**ADDITIONAL APPLICATION CHARACTERISTICS** (GND = 0 V)

Symbol	Parameter	Condition	V <sub>CC</sub> V	V <sub>EE</sub> V	Typ	Unit
					25°C	
BW	Maximum On-Channel Bandwidth or Minimum Frequency Response	(Figure 5)	3.0	0.0	80	MHz
			4.5	0.0	80	
			6.0	0.0	80	
			3.0	-3.0	80	
V <sub>ISO</sub>	Off-Channel Feedthrough Isolation	(Figure 6)	3.0	0.0	-70	dB
			4.5	0.0	-70	
			6.0	0.0	-70	
			3.0	-3.0	-70	
V <sub>ONL</sub>	Maximum Feedthrough On Loss	(Figure 7)	3.0	0.0	-2	dB
			4.5	0.0	-2	
			6.0	0.0	-2	
			3.0	-3.0	-2	
Q	Charge Injection	(Figure 8)	5.0	0.0	9.0	pC
			3.0	-3.0	12	
THD	Total Harmonic Distortion + Noise	f <sub>IS</sub> = 1 MHz, R <sub>L</sub> = 10 KΩ, C <sub>L</sub> = 50 pF, V <sub>IS</sub> = 5.0 V <sub>PP</sub> sine wave + DC Bias V <sub>IS</sub> = 6.0 V <sub>PP</sub> sine wave + DC Bias (Figure 16)	6.0	0.0	0.10	%
			3.0	-3.0	0.05	

MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053

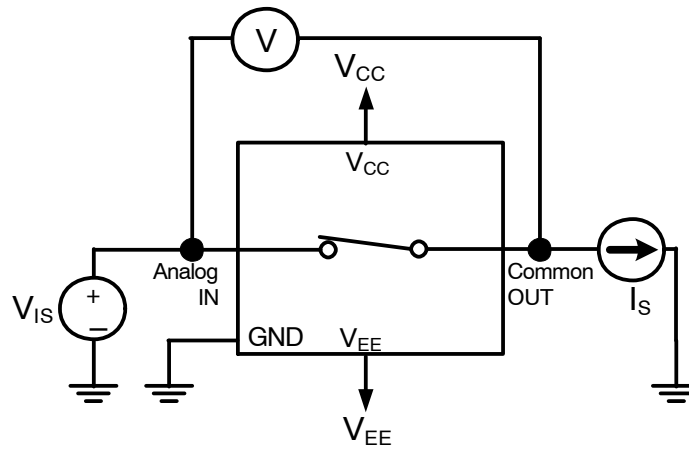


Figure 1. On Resistance

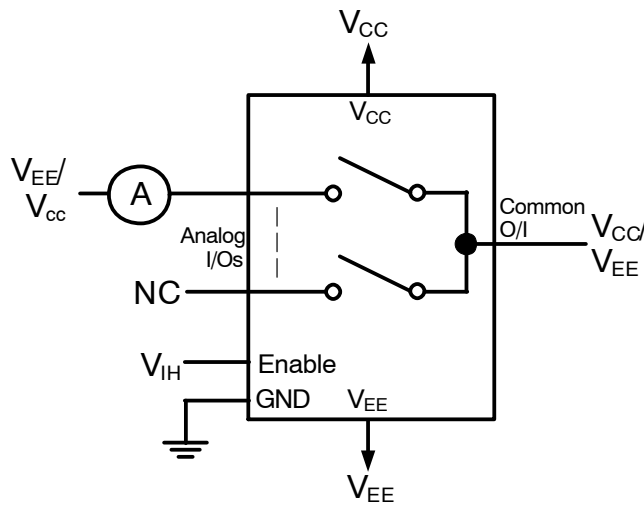


Figure 2. Off Channel Leakage, Any One Channel

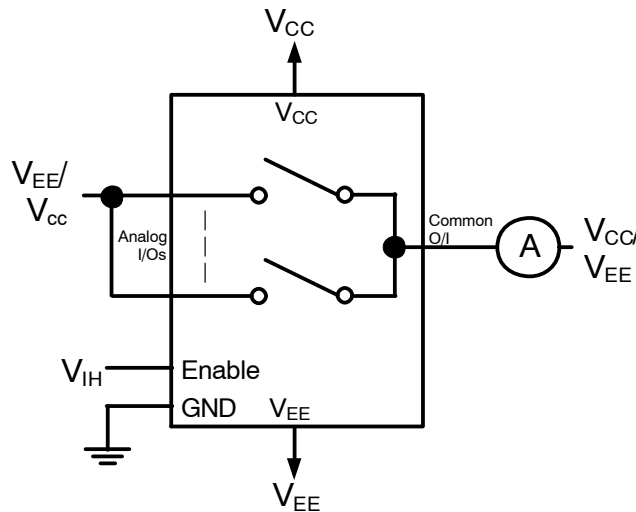


Figure 3. Off Channel Leakage, Common Channel

MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052,  
MC74LVXT4053

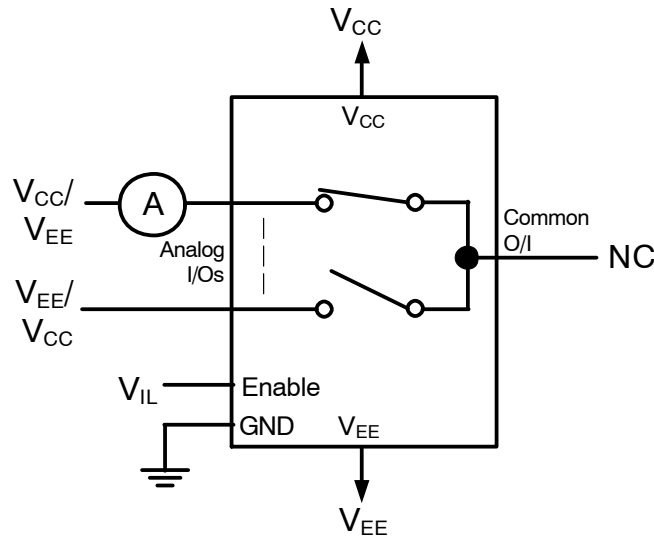
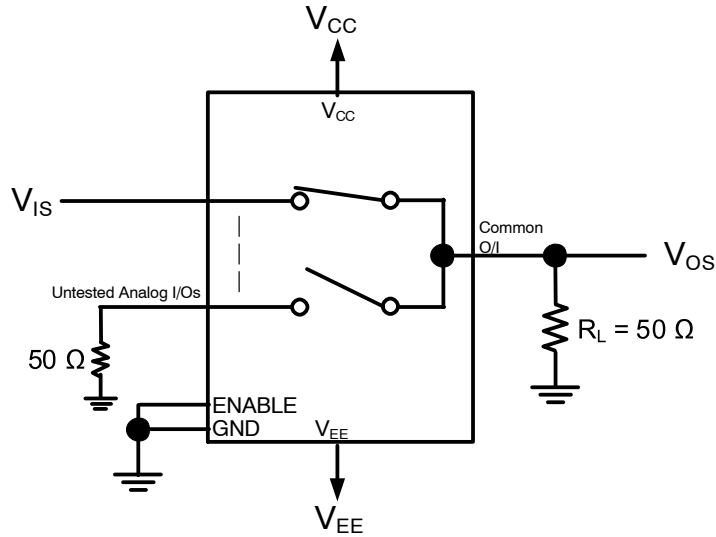


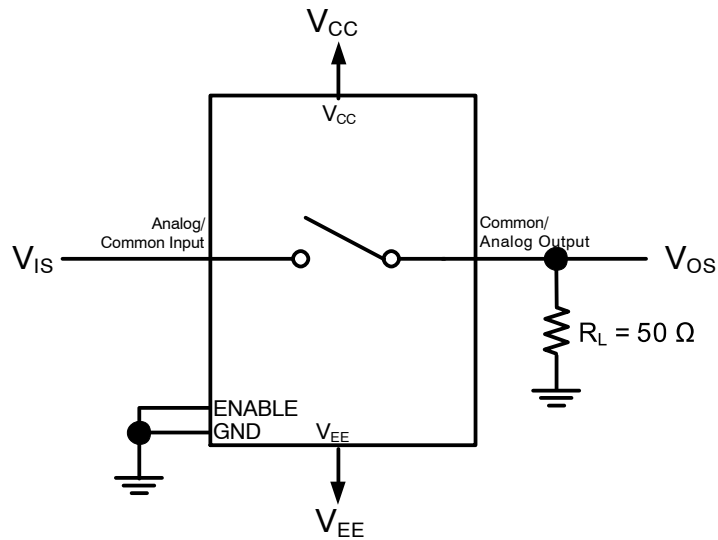
Figure 4. On Channel Leakage



- DC Bias =  $(V_{CC} + V_{EE})/2$   
 $V_{IS}$  = sine wave + DC Bias  
 (1) Adjust  $V_{IS}$  Amplitude for 0 dBm at  $V_{OS}$   
 (2) Increase  $f_{IS}$  until  $V_{OS}$  at -3 dB of step 1

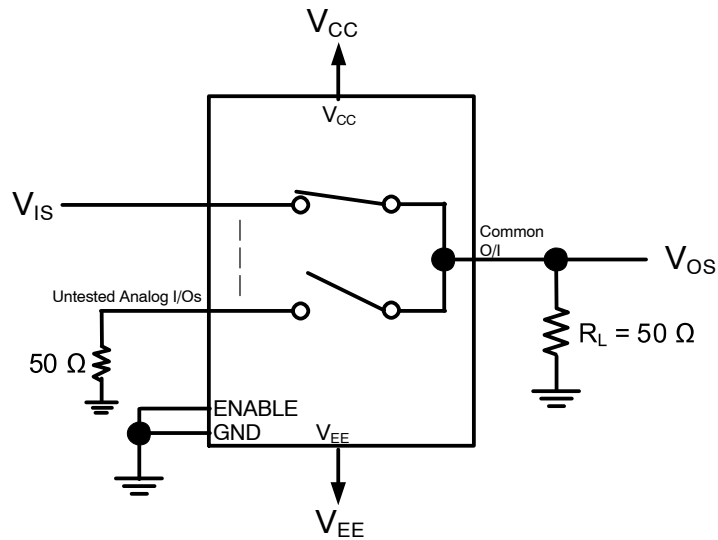
Figure 5. Bandwidth

**MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053**



$f = 1 \text{ MHz}$   
 $\text{DC Bias} = (V_{CC} + V_{EE})/2$   
 $V_{IS} = \text{sine wave} + \text{DC Bias}$   
 (1) Adjust  $V_{IS}$  Amplitude to 10 dBm  
 (2)  $V_{ISO}(\text{dB}) = 20 \log (V_{OS}/V_{IS})$

**Figure 6. Common/Off Channel Feedthrough Isolation**



$f_{IS} = 1 \text{ kHz}$   
 $\text{DC Bias} = (V_{CC} + V_{EE})/2$   
 $V_{IS} = \text{sine wave} + \text{DC Bias}$   
 (1) Adjust  $V_{IS}$  Amplitude to 0 dBm  
 (2)  $V_{ONL}(\text{dB}) = 20 \log (V_{OS}/V_{IS})$

**Figure 7. On Channel Feedthrough On Loss**

MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052,  
MC74LVXT4053

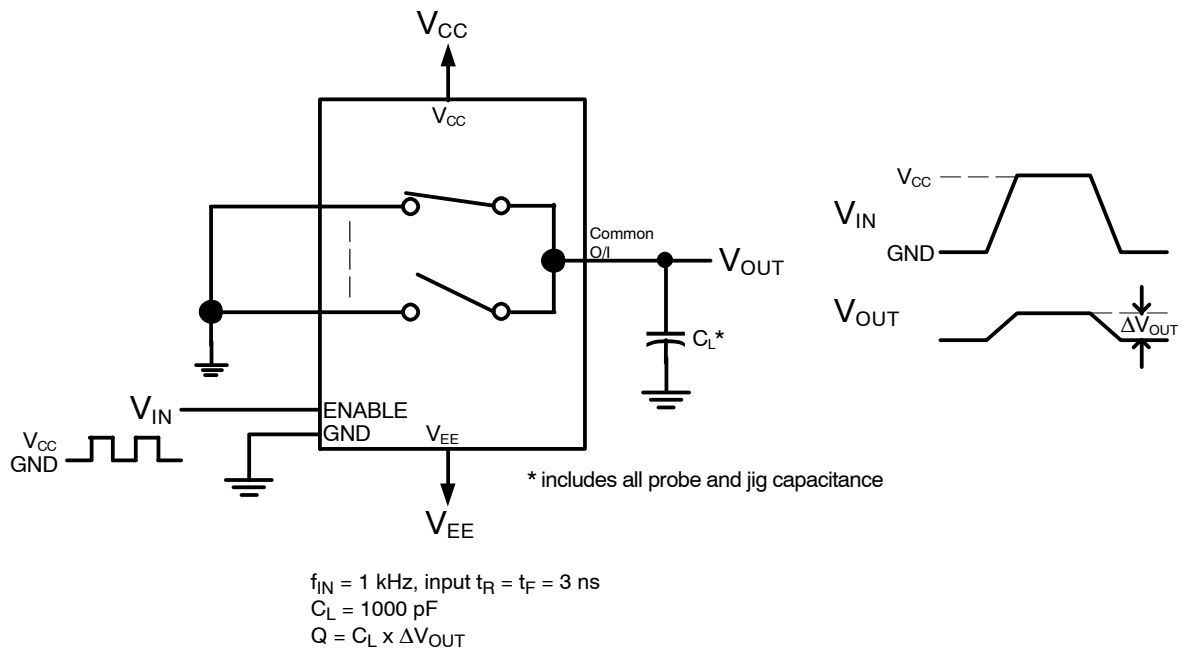
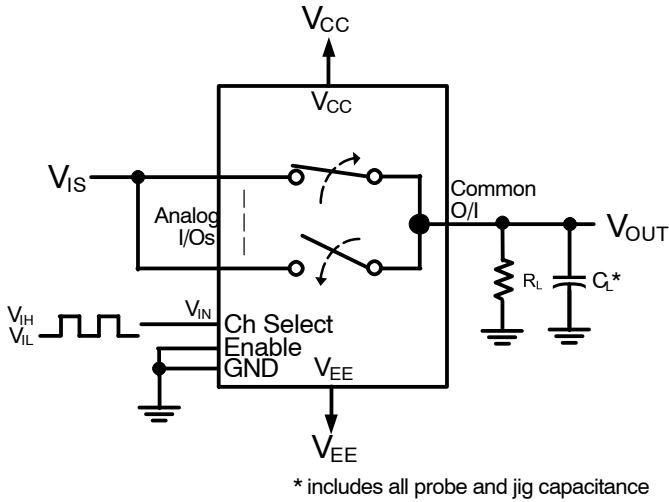
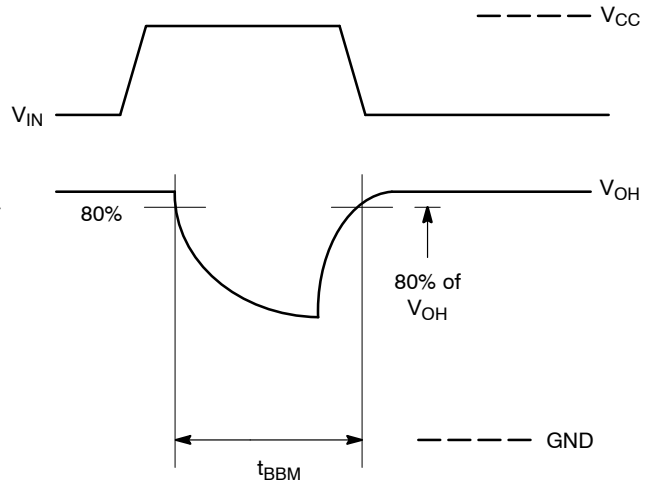


Figure 8. Charge Injection

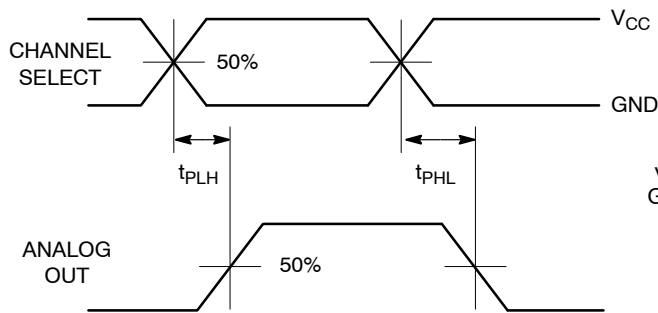
**MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053**



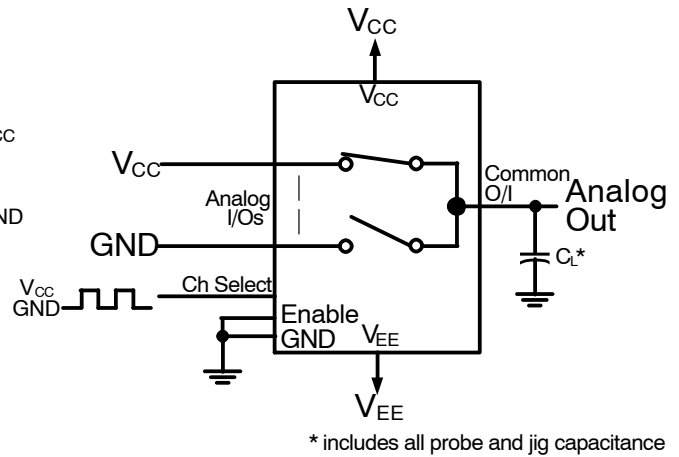
**Figure 9. Break-Before-Make**



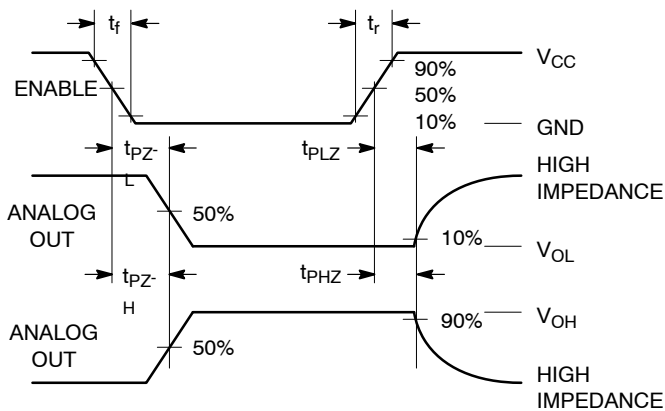
**Figure 10. Break-Before-Make Time**



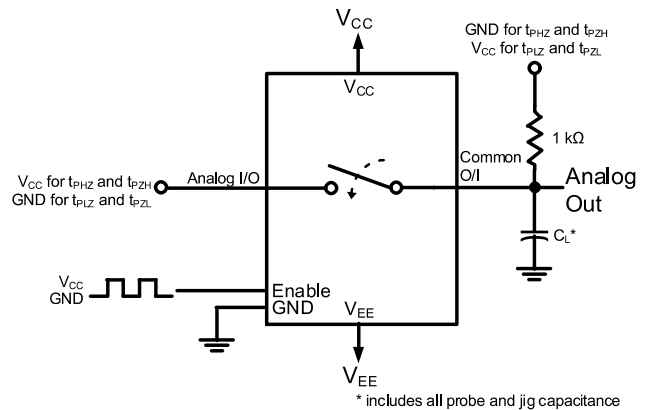
**Figure 11. Propagation Delays, Channel Select to Analog Out**



**Figure 12. Propagation Delay, Select to Analog Out**



**Figure 13. Propagation Delays, Enable to Analog Out**



**Figure 14. Propagation Delay, Enable to Analog Out**

MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053

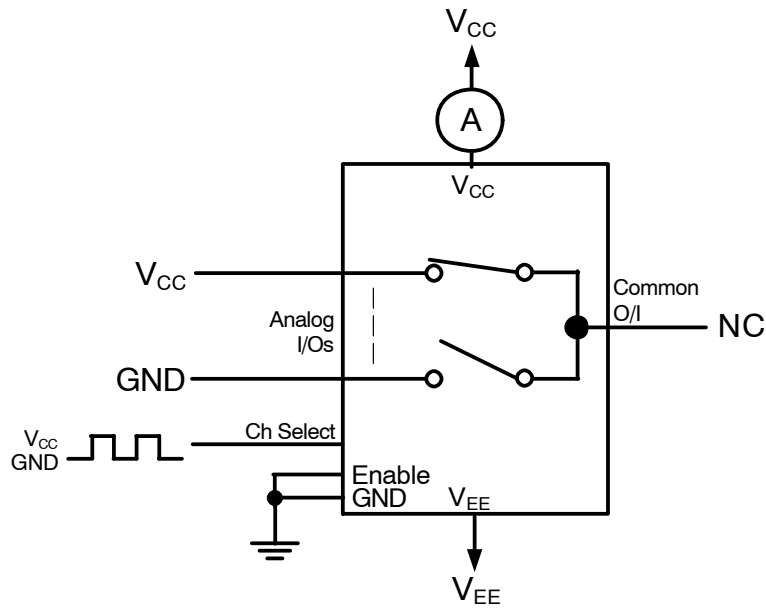
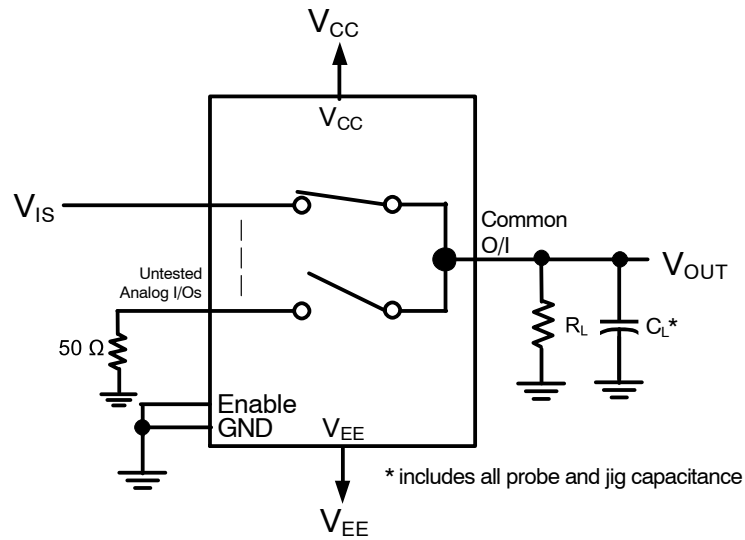


Figure 15. Power Dissipation Capacitance



\* includes all probe and jig capacitance

$$\text{DC Bias} = (V_{CC} + V_{EE})/2$$

Figure 16. Total Harmonic Distortion

# MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053

## APPLICATIONS INFORMATION

The Channel Select and Enable control pins should be at  $V_{CC}$  or GND logic levels.  $V_{CC}$  being recognized as a logic high and GND being recognized as a logic low. In this example:

$$\begin{aligned} V_{CC} &= +5 \text{ V} = \text{logic high} \\ \text{GND} &= 0 \text{ V} = \text{logic low} \end{aligned}$$

The maximum analog voltage swing is determined by the supply voltages  $V_{CC}$  and  $V_{EE}$ . The positive peak analog voltage should not exceed  $V_{CC}$ . Similarly, the negative peak analog voltage should not go below  $V_{EE}$ . In this example, the difference between  $V_{CC}$  and  $V_{EE}$  is five volts. Therefore, using the configuration of Figure 18, a maximum analog signal of five volts peak-to-peak can be controlled. Unused analog inputs/outputs may be left floating (i.e., not connected). However, tying unused analog inputs and

outputs to  $V_{CC}$  or GND through a low value resistor helps minimize crosstalk and feedthrough noise that may be picked up by an unused switch.

Although used here, balanced supplies are not a requirement. The only constraints on the power supplies are that:

$$\begin{aligned} V_{EE} - \text{GND} &= 0 \text{ to } -3.5 \text{ volts} \\ V_{CC} - \text{GND} &= 2.5 \text{ to } 6 \text{ volts} \\ V_{CC} - V_{EE} &= 2.5 \text{ to } 6 \text{ volts} \\ &\text{and } V_{EE} \leq \text{GND} \end{aligned}$$

When voltage transients above  $V_{CC}$  and/or below  $V_{EE}$  are anticipated on the analog channels, external Germanium or Schottky diodes ( $D_x$ ) are recommended as shown in Figure 19. These diodes should be able to absorb the maximum anticipated current surges during clipping.

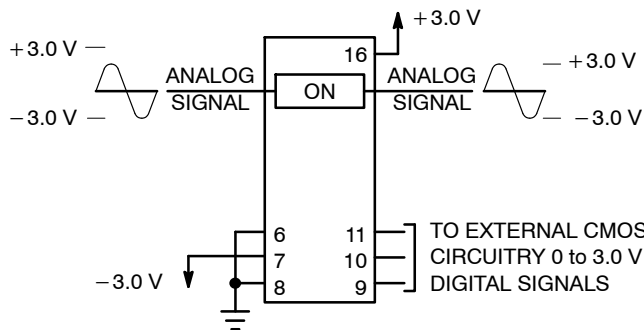


Figure 17. Application Example

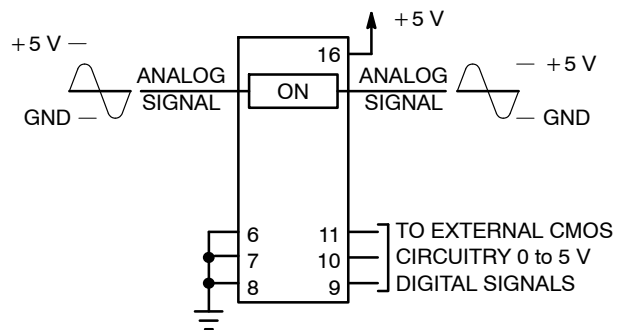


Figure 18. Application Example

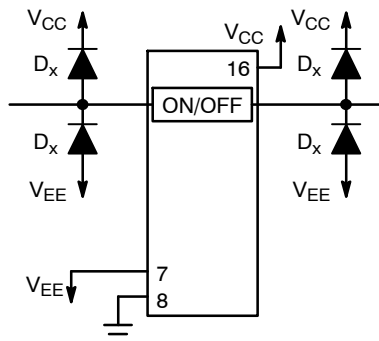
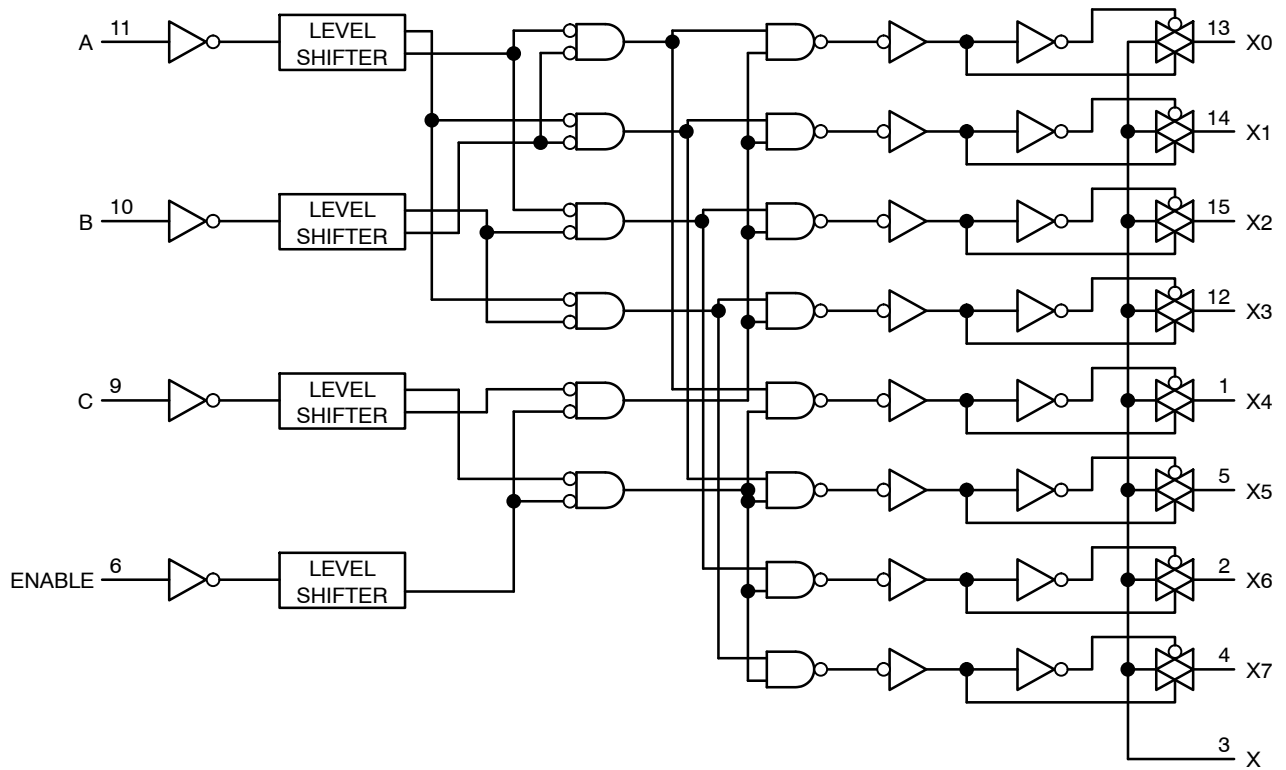
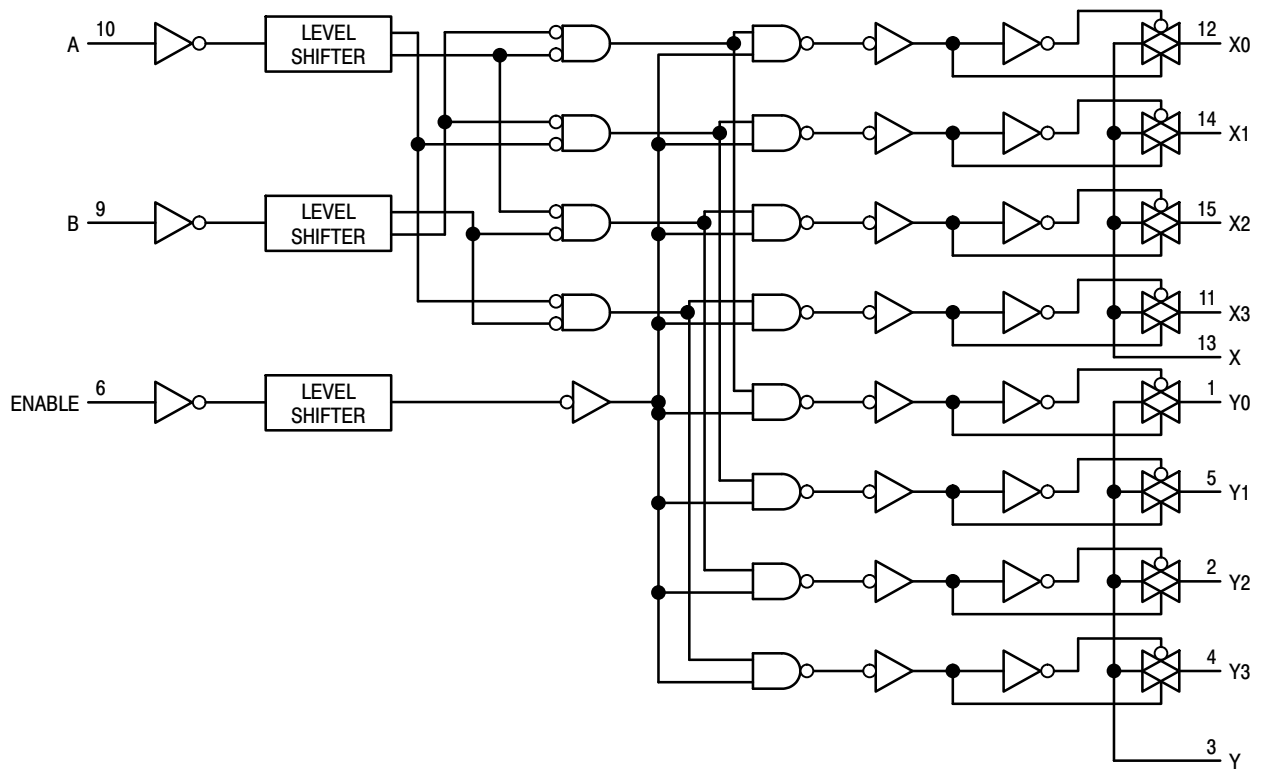


Figure 19. External Germanium or Schottky Clipping Diodes

**MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053**

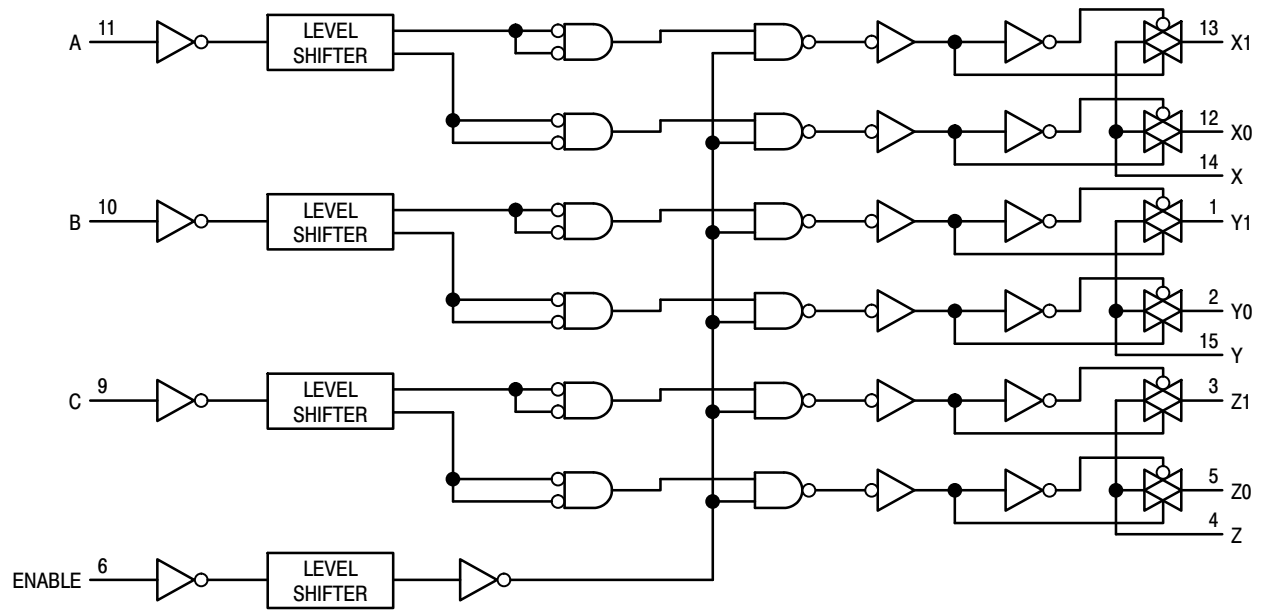


**Figure 20. Function Diagram, 4051**



**Figure 21. Function Diagram, 4052**

**MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052, MC74LVXT4053**



**Figure 22. Function Diagram, 4053**

**MC74LVX4051, MC74LVX4052, MC74LVX4053, MC74LVXT4051, MC74LVXT4052,  
MC74LVXT4053**

**ORDERING INFORMATION**

Device	Marking	Package	Shipping†
MC74LVX4051DG	LVX4051G	SOIC-16	48 Units / Rail
MC74LVX4051DR2G	LVX4051G	SOIC-16	2500 / Tape & Reel
MC74LVX4051DTG	LVX 4051	TSSOP-16	96 Units / Rail
MC74LVX4051DTR2G	LVX 4051	TSSOP-16	2500 / Tape & Reel
MC74LVX4051DTR2G-Q*	LVX 4051	TSSOP-16	2500 / Tape & Reel
MC74LVX4051MNTWG	4051	QFN-16	3000 / Tape & Reel (8mm pitch carrier tape)
MC74LVX4052DG	LVX4052G	SOIC-16	48 Units / Rail
MC74LVX4052DR2G	LVX4052G	SOIC-16	2500 / Tape & Reel
MC74LVX4052DTR2G	LVX 4052	TSSOP-16	2500 / Tape & Reel
MC74LVX4052DTR2G-Q*	LVX 4052	TSSOP-16	2500 / Tape & Reel
MC74LVX4053DG	LVX4053G	SOIC-16	48 Units / Rail
MC74LVX4053DTG	LVX 4053	TSSOP-16	96 Units / Rail
MC74LVXT4051DR2G	LVXT4051G	SOIC-16	2500 / Tape & Reel
MC74LVXT4051DTR2G	LVXT 4051	TSSOP-16	2500 / Tape & Reel
MC74LVXT4052DR2G	LVX4052G	SOIC-16	2500 / Tape & Reel
MC74LVXT4052DTG	LVX 4052	TSSOP-16	96 Units / Rail
MC74LVXT4052DTR2G	LVX 4052	TSSOP-16	2500 / Tape & Reel
MC74LVXT4053DR2G	LVX4053G	SOIC-16	2500 / Tape & Reel
MC74LVXT4053DTG	LVX 4053	TSSOP-16	96 Units / Rail
MC74LVXT4053DTR2G	LVX 4053	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.

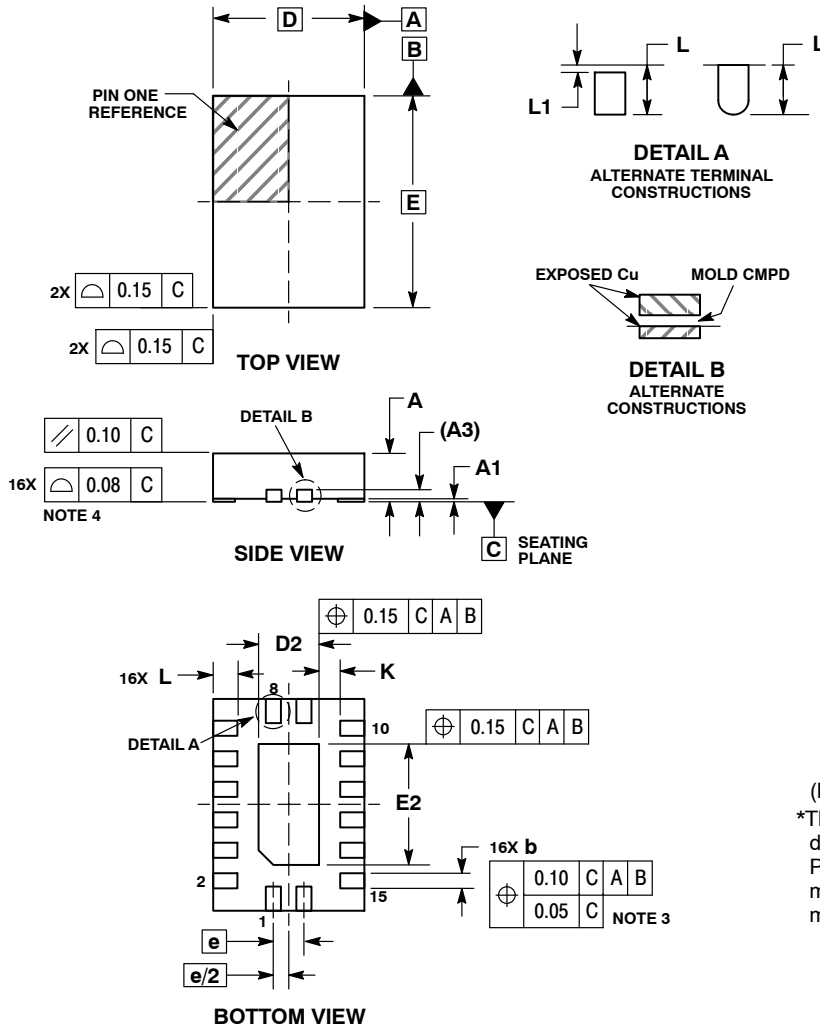
\*-Q Suffix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.



SCALE 2:1

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

DATE 11 DEC 2008

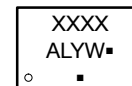


NOTES:

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\*

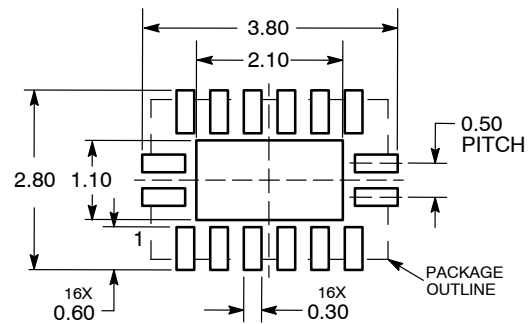


- XXXX = Specific Device Code
- A = Assembly Location
- L = Wafer Lot
- Y = Year
- W = Work Week
- = Pb-Free Package

(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\*

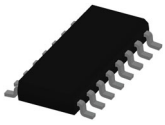


DIMENSIONS: MILLIMETERS

\*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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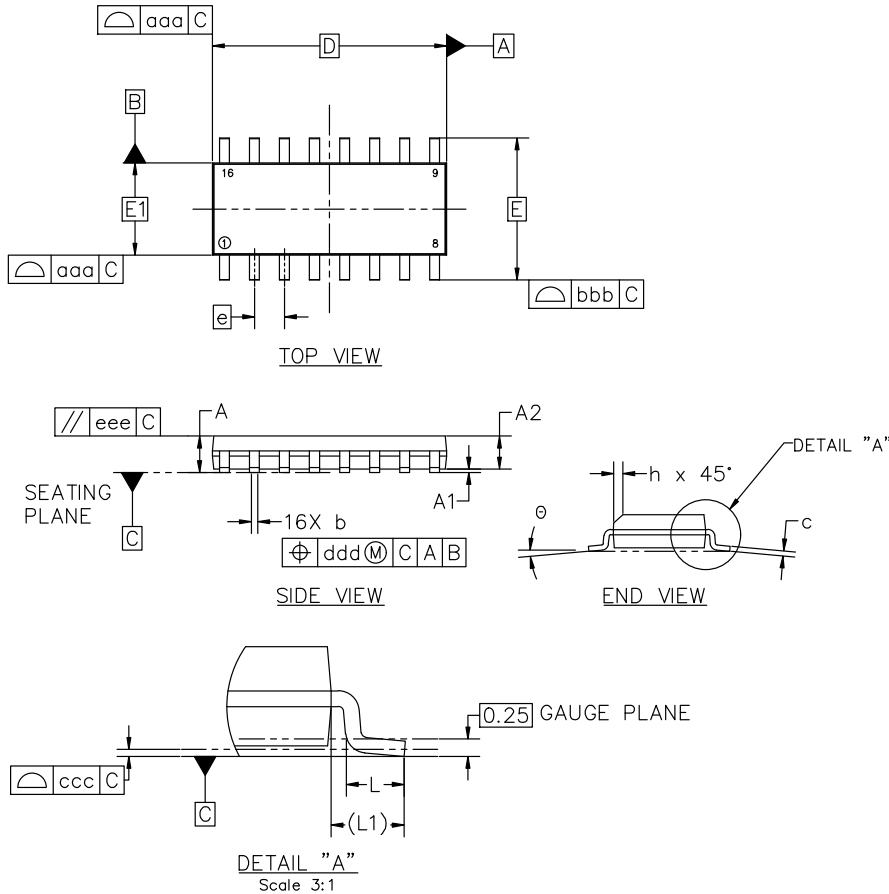


**SOIC-16 9.90x3.90x1.37 1.27P**  
**CASE 751B**  
**ISSUE M**

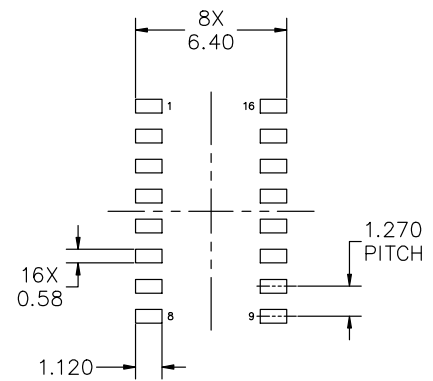
DATE 18 OCT 2024

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		
$\theta$	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

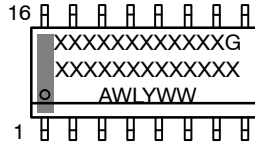
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**SOIC-16 9.90x3.90x1.37 1.27P**  
**CASE 751B**  
**ISSUE M**

DATE 18 OCT 2024

**GENERIC  
MARKING DIAGRAM\***



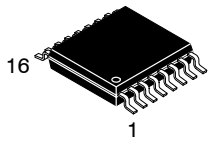
XXXXX = Specific Device Code  
A = Assembly Location  
WL = Wafer Lot  
Y = Year  
WW = Work Week  
G = Pb-Free Package

\*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.

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

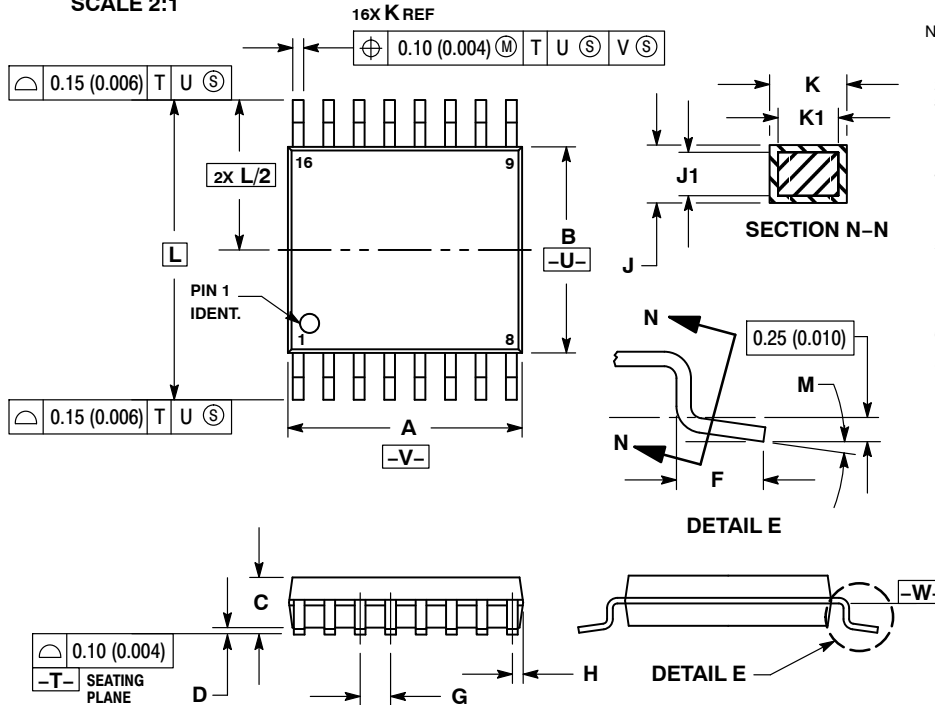
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TSSOP-16 WB  
CASE 948F  
ISSUE B

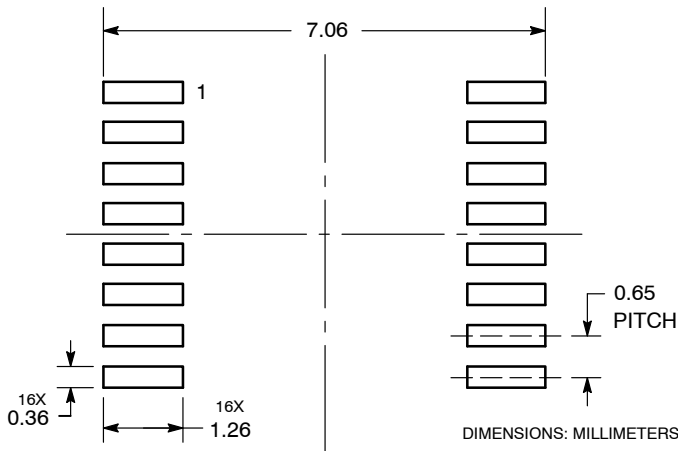
DATE 19 OCT 2006



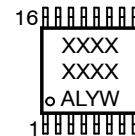
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETER.
  3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
  4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION.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



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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