



**Is Now Part of**



**ON Semiconductor®**

**To learn more about ON Semiconductor, please visit our website at  
[www.onsemi.com](http://www.onsemi.com)**

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

# 74VHC4051, 8-Channel Analog Multiplexer 74VHC4052, Dual 4-Channel Analog Multiplexer 74VHC4053, Triple 2-Channel Analog Multiplexer

## Features

- Wide analog input voltage range:  $\pm 6V$
- Low "ON" resistance: 50 Typ. ( $V_{CC}-V_{EE} = 4.5V$ )
- 30 Typ. ( $V_{CC}-V_{EE} = 9V$ )
- Logic level translation to enable 5V logic with  $\pm 5V$  analog signals
- Low quiescent current: 80 $\mu A$  maximum
- Matched switch characteristic
- Pin and function compatible with the 74HC4051/ 4052/4053

## General Description

These multiplexers are digitally controlled analog switches implemented in advanced silicon-gate CMOS technology. These switches have low "ON" resistance and low "OFF" leakages. They are bidirectional switches, thus any analog input may be used as an output and vice-versa. Also these switches contain linearization circuitry which lowers the "ON" resistance and increases switch linearity. These devices allow control of up to  $\pm 6V$  (peak) analog signals with digital control signals of 0 to 6V. Three supply pins are provided for  $V_{CC}$ , ground, and  $V_{EE}$ . This enables the connection of 0–5V logic signals when  $V_{CC} = 5V$  and an analog input range of  $\pm 5V$  when  $V_{EE} = 5V$ . All three devices also have an inhibit control which when high will disable all switches to their off state. All analog inputs and outputs and digital inputs are protected from electrostatic damage by diodes to  $V_{CC}$  and ground.

VHC4051: This device connects together the outputs of 8 switches, thus achieving an 8 channel Multiplexer. The binary code placed on the A, B, and C select lines determines which one of the eight switches is "ON", and connects one of the eight inputs to the common output.

VHC4052: This device connects together the outputs of 4 switches in two sets, thus achieving a pair of 4-channel multiplexers. The binary code placed on the A, and B select lines determine which switch in each 4 channel section is "ON", connecting one of the four inputs in each section to its common output. This enables the implementation of a 4-channel differential multiplexer.

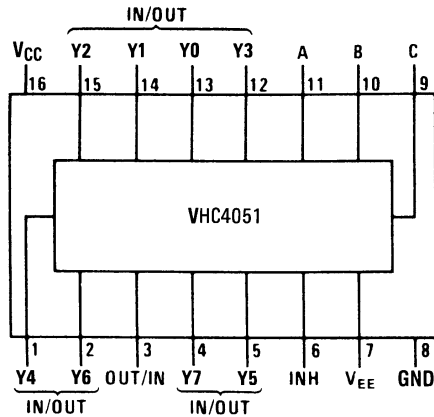
VHC4053: This device contains 6 switches whose outputs are connected together in pairs, thus implementing a triple 2 channel multiplexer, or the equivalent of 3 single-pole-double throw configurations. Each of the A, B, or C select lines independently controls one pair of switches, selecting one of the two switches to be "ON".

## Ordering Information

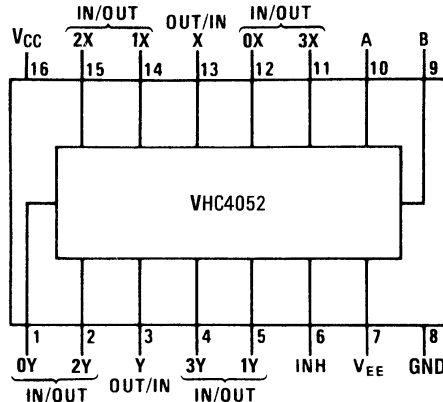
Order Number	Package Number	Package Description
74VHC4051M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74VHC4051WM	M16B	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74VHC4051MTC	MTC16	16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74VHC4051N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
74VHC4052M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74VHC4052WM	M16B	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74VHC4052MTC	MTC16	16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74VHC4053M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
74VHC4053WM	M16B	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74VHC4053MTC	MTC16	16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide

Surface mount packages are also available on Tape and Reel. Specify by appending the suffix letter "X" to the ordering number.

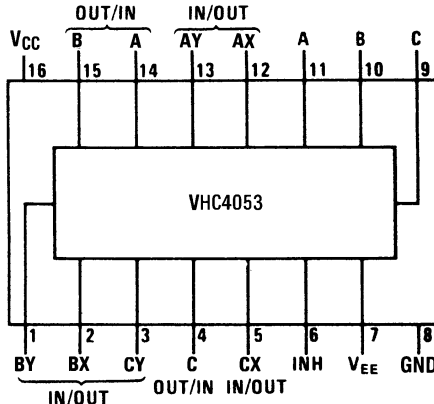
# Connection Diagrams



Top View



Top View



Top View

# Truth Tables

## 74VHC4051

Input				“ON” Channel
INH	C	B	A	
H	X	X	X	None
L	L	L	L	Y0
L	L	L	H	Y1
L	L	H	L	Y2
L	L	H	H	Y3
L	H	L	L	Y4
L	H	L	H	Y5
L	H	H	L	Y6
L	H	H	H	Y7

## 74VHC4052

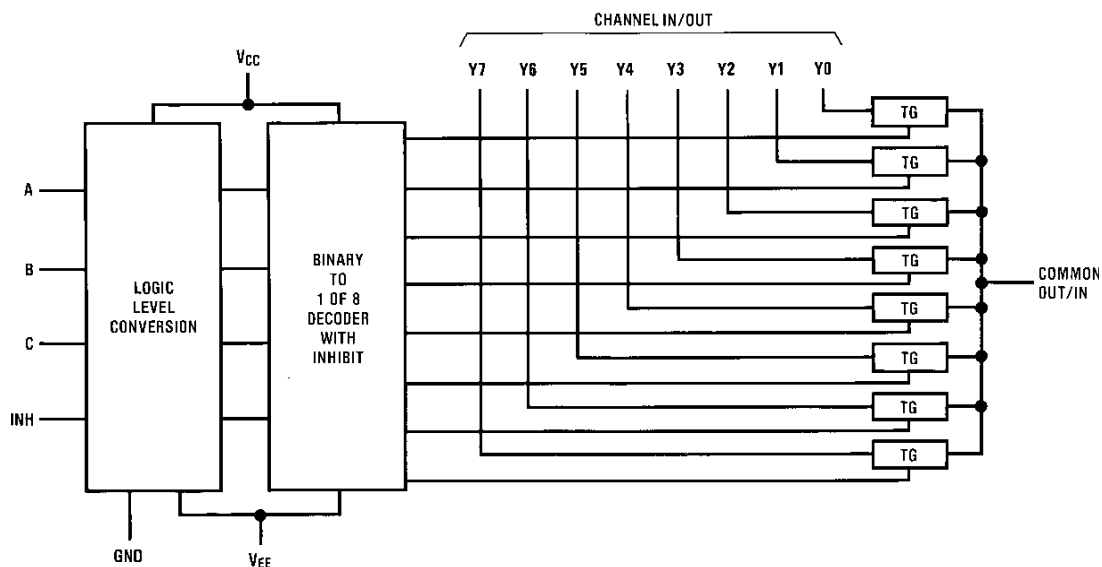
Inputs			“ON” Channels	
INH	B	A	X	Y
H	X	X	None	None
L	L	L	0X	0Y
L	L	H	1X	1Y
L	H	L	2X	2Y
L	H	H	3X	3Y

## 74VHC4053

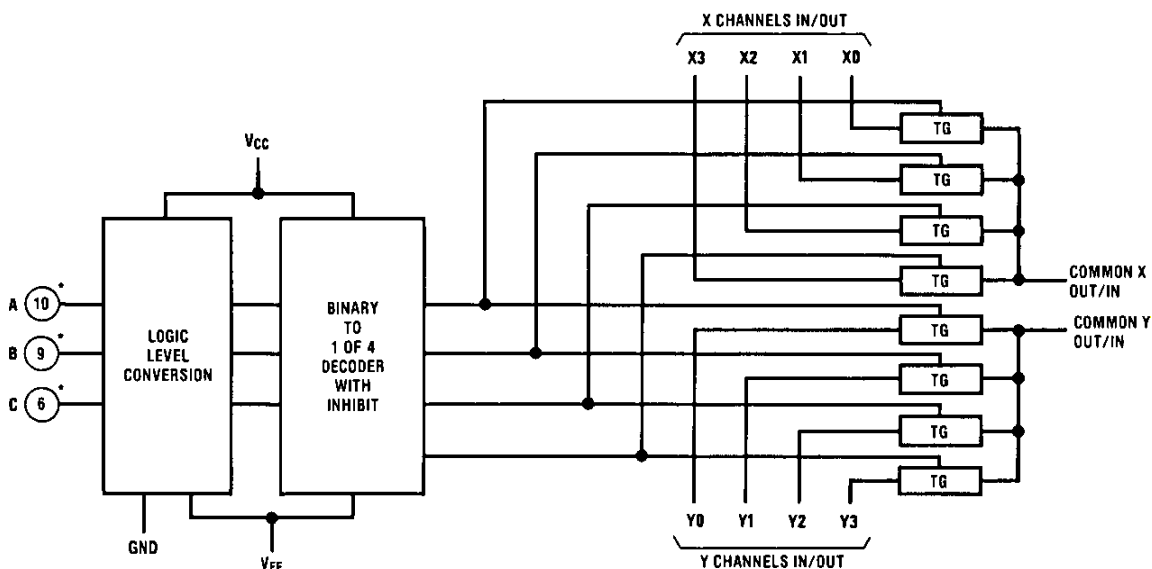
Input				“ON” Channels		
INH	C	B	A	C	B	A
H	X	X	X	None	None	None
L	L	L	L	CX	BX	AX
L	L	L	H	CX	BX	AY
L	L	H	L	CX	BY	AX
L	L	H	H	CX	BY	AY
L	H	L	L	CY	BX	AX
L	H	L	H	CY	BX	AY
L	H	H	L	CY	BY	AX
L	H	H	H	CY	BY	AY

## Logic Diagrams

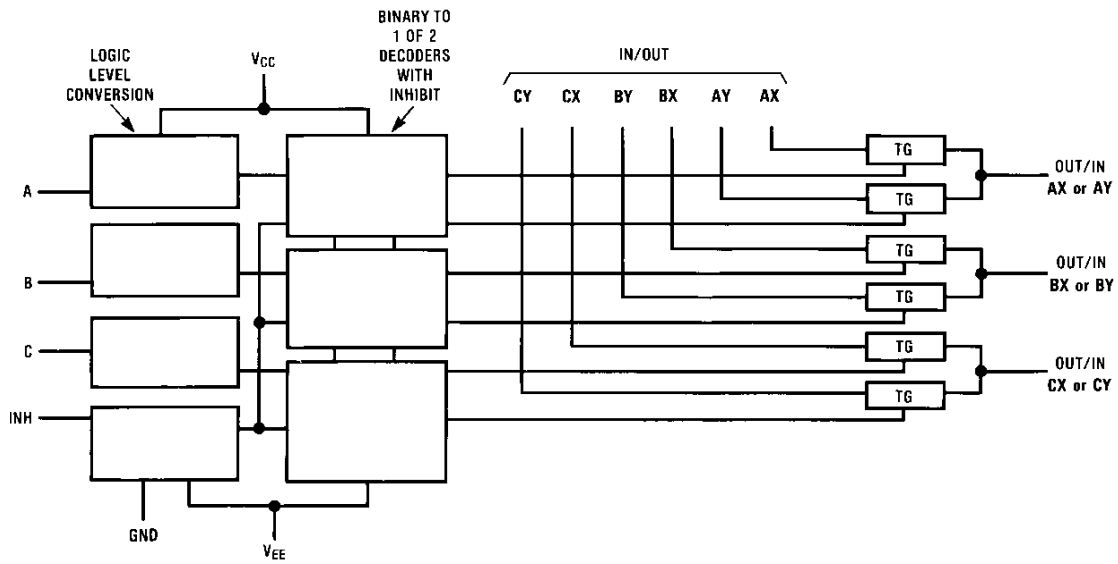
74VHC4051



74VHC4052



# 74VHC4053



## Absolute Maximum Ratings<sup>(1)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
$V_{CC}$	Supply Voltage	−0.5 to +7.5V
$V_{EE}$	Supply Voltage	+0.5 to −7.5V
$V_{IN}$	Control Input Voltage	−1.5 to $V_{CC}+1.5V$
$V_{IO}$	Switch I/O Voltage	$V_{EE}-0.5$ to $V_{CC}+0.5V$
$I_{IK}, I_{OK}$	Clamp Diode Current	±20mA
$I_{OUT}$	Output Current, per pin	±25mA
$I_{CC}$	$V_{CC}$ or GND Current, per pin	±50mA
$T_{STG}$	Storage Temperature Range	−65°C to +150°C
$P_D$	Power Dissipation <sup>(2)</sup> S.O. Package only	600mW 500mW
$T_L$	Lead Temperature (Soldering 10 seconds)	260°C

### Note:

1. Unless otherwise specified all voltages are referenced to ground.
2. Power Dissipation temperature derating; plastic “N” package: -12mW/°C from 65°C to 85°C.

## Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

Symbol	Parameter	Min.	Max.	Units
$V_{CC}$	Supply Voltage	2	6	V
$V_{EE}$	Supply Voltage	0	−6	V
$V_{IN}, V_{OUT}$	DC Input or Output Voltage	0	$V_{CC}$	V
$T_A$	Operating Temperature Range	−40	+85	°C
$t_r, t_f$	Input Rise or Fall Times $V_{CC} = 2.0V$ $V_{CC} = 4.5V$ $V_{CC} = 6.0V$		1000 500 400	ns

### DC Electrical Characteristics<sup>(3)</sup>

Symbol	Parameter		Conditions	V <sub>EE</sub>	V <sub>CC</sub>	Typ.	T <sub>A</sub> = 25°C	T <sub>A</sub> = −40 to 85°C	Units
							Guaranteed Limits		
V <sub>IH</sub>	Minimum HIGH Level Input Voltage				2.0V		1.5	1.5	V
					4.5V		3.15	3.15	
					6.0V		4.2	4.2	
V <sub>IL</sub>	Maximum LOW Level Input Voltage				2.0V		0.5	0.5	V
					4.5V		1.35	1.35	
					6.0V		1.8	1.8	
R <sub>ON</sub>	Maximum “ON” Resistance <sup>(4)</sup>		V <sub>INH</sub> = V <sub>IL</sub> , I <sub>S</sub> = 2.0mA, V <sub>IS</sub> = V <sub>CC</sub> to V <sub>EE</sub> (Fig. 1)	GND	4.5V	40	160	200	Ω
				−4.5V	4.5V	30	120	150	
				−6.0V	6.0V	20	100	125	
			V <sub>INH</sub> = V <sub>IL</sub> , I <sub>S</sub> = 2.0mA, V <sub>IS</sub> = V <sub>CC</sub> or V <sub>EE</sub> (Fig. 1)	GND	2.0V	100	230	280	Ω
				GND	4.5V	40	110	140	
				−4.5V	4.5V	20	90	120	
				−6.0V	6.0V	15	80	100	
R <sub>ON</sub>	Maximum “ON” Resistance Matching		V <sub>INH</sub> = V <sub>IL</sub> , V <sub>IS</sub> = V <sub>CC</sub> to GND	GND	4.5V	10	20	25	Ω
				−4.5V	4.5V	5	10	15	
				−6.0V	6.0V	5	10	12	
I <sub>N</sub>	Maximum Control Input Current		V <sub>IN</sub> = V <sub>CC</sub> or GND, V <sub>CC</sub> = 2 – 6V				±.05	±0.5	μA
I <sub>CC</sub>	Maximum Quiescent Supply Current		V <sub>IN</sub> = V <sub>CC</sub> or GND, I <sub>OUT</sub> = 0μA	GND	6.0V		4	40	μA
				−6.0V	6.0V		8	80	
I <sub>IZ</sub>	Maximum Switch “OFF” Leakage Current (Switch Input)		V <sub>OS</sub> = V <sub>CC</sub> or V <sub>EE</sub> , V <sub>IS</sub> = V <sub>EE</sub> or V <sub>CC</sub> , V <sub>INH</sub> = V <sub>IH</sub> (Fig. 2)	GND	6.0V		±60	±300	nA
				−6.0V	6.0V		±100	±500	
I <sub>IZ</sub>	Maximum Switch “ON” Leakage Current	VHC4051	V <sub>IS</sub> = V <sub>CC</sub> to V <sub>EE</sub> , V <sub>INH</sub> = V <sub>IL</sub> (Fig. 3)	GND	6.0V		±0.1	±1.0	μA
				−6.0V	6.0V		±0.2	±2.0	
		VHC4052	V <sub>IS</sub> = V <sub>CC</sub> to V <sub>EE</sub> , V <sub>INH</sub> = V <sub>IL</sub> (Fig. 3)	GND	6.0V		±0.050	±0.5	
				−6.0V	6.0V		±0.1	±1.0	
		VHC4053	V <sub>IS</sub> = V <sub>CC</sub> to V <sub>EE</sub> , V <sub>INH</sub> = V <sub>IL</sub> (Fig. 3)	GND	6.0V		±0.05	±0.5	
				−6.0V	6.0V		±0.5	±0.5	
I <sub>IZ</sub>	Maximum Switch “OFF” Leakage Current (Common Pin)	VHC4051	V <sub>OS</sub> = V <sub>CC</sub> or V <sub>EE</sub> , V <sub>IS</sub> = V <sub>EE</sub> or V <sub>CC</sub> , V <sub>INH</sub> = V <sub>IH</sub>	GND	6.0V		±0.1	±1.0	μA
				−6.0V	6.0V		±0.2	±2.0	
		VHC4052	V <sub>OS</sub> = V <sub>CC</sub> or V <sub>EE</sub> , V <sub>IS</sub> = V <sub>EE</sub> or V <sub>CC</sub> , V <sub>INH</sub> = V <sub>IH</sub>	GND	6.0V		±0.05	±0.5	
				−6.0V	6.0V		±0.1	±1.0	
		VHC4053	V <sub>OS</sub> = V <sub>CC</sub> or V <sub>EE</sub> , V <sub>IS</sub> = V <sub>EE</sub> or V <sub>CC</sub> , V <sub>INH</sub> = V <sub>IH</sub>	GND	6.0V		±0.05	±0.5	
				−6.0V	6.0V		±0.05	±0.5	

#### Notes:

- For a power supply of 5V ±10% the worst case on resistances (R<sub>ON</sub>) occurs for VHC at 4.5V. Thus the 4.5V values should be used when designing with this supply. Worst case V<sub>IH</sub> and V<sub>IL</sub> occur at V<sub>CC</sub> = 5.5V and 4.5V respectively. (The V<sub>IH</sub> value at 5.5V is 3.85V.) The worst case leakage current occur for CMOS at the higher voltage and so the 5.5V values should be used.
- At supply voltages (V<sub>CC</sub>–V<sub>EE</sub>) approaching 2V the analog switch on resistance becomes extremely non-linear. Therefore it is recommended that these devices be used to transmit digital only when using these supply voltages.
- Adjust 0dB for f = 1kHz (Null R1/R<sub>ON</sub> Attenuation).



## AC Electrical Characteristics

$V_{CC} = 2.0V - 6.0V$ ,  $V_{EE} = 0V - 6V$ ,  $C_L = 50pF$  (unless otherwise specified)

Symbol	Parameter	Conditions		V <sub>EE</sub>	V <sub>CC</sub>	T <sub>A</sub> =25°C		T <sub>A</sub> =−40 to 85°C	Units
						Typ.	Guaranteed Limits		
t <sub>PHL</sub> , t <sub>PLH</sub>	Maximum Propagation Delay Switch In to Out			GND	3.3V	25	35	40	ns
				GND	4.5V	5	12	15	
				−4.5V	4.5V	4	8	12	
				−6.0V	6.0V	3	7	11	
t <sub>PZL</sub> , t <sub>PZH</sub>	Maximum Switch Turn “ON” Delay	R <sub>L</sub> = 1kΩ		GND	3.3V	92	200	250	ns
				GND	4.5V		69	87	
				−4.5V	4.5V	16	46	58	
				−6.0V	6.0V	15	41	51	
t <sub>PHZ</sub> , t <sub>PLZ</sub>	Maximum Switch Turn “OFF” Delay			GND	3.3V	65	170	210	ns
				GND	4.5V	28	58	73	
				−4.5V	4.5V	18	37	46	
				−6.0V	6.0V	16	32	41	
f <sub>MAX</sub>	Minimum Switch Frequency Response 20 log (V <sub>I</sub> /V <sub>O</sub> ) = 3dB			GND	4.5V	30			MHz
				−4.5V	4.5V	35			
	Control to Switch Feedthrough Noise	R <sub>L</sub> = 600Ω, f = 1MHz, C <sub>L</sub> = 50pF	V <sub>IS</sub> = 4 V <sub>PP</sub>	0V	4.5V	1080			mV
			V <sub>IS</sub> = 8 V <sub>PP</sub>	−4.5V	4.5V	250			
	Crosstalk Between any Two Switches	R <sub>L</sub> = 600Ω, f = 1 MHz	V <sub>IS</sub> = 4 V <sub>PP</sub>	0V	4.5	−52			dB
			V <sub>IS</sub> = 8 V <sub>PP</sub>	−4.5V	4.5V	−50			
	Switch OFF Signal Feedthrough Isolation	R <sub>L</sub> = 600Ω, f = 1 MHz, V <sub>CTL</sub> = V <sub>IL</sub>	V <sub>IS</sub> = 4 V <sub>PP</sub>	0V	4.5V	−42			dB
			V <sub>IS</sub> = 8 V <sub>PP</sub>	−4.5V	4.5V	−44			
THD	Sinewave Harmonic Distortion	R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 50pF, f = 1kHz	V <sub>IS</sub> = 4 V <sub>PP</sub>	0V	4.5V	0.013			%
			V <sub>IS</sub> = 8 V <sub>PP</sub>	−4.5V	4.5V	0.008			
C <sub>IN</sub>	Maximum Control Input Capacitance					5	10	10	pF
C <sub>IN</sub>	Maximum Switch Input Capacitance	Input 4051 Common 4052 Common 4053 Common				15 90 45 30			pF
C <sub>IN</sub>	Maximum Feedthrough Capacitance					5			pF

## AC Test Circuits and Switching Time Waveforms

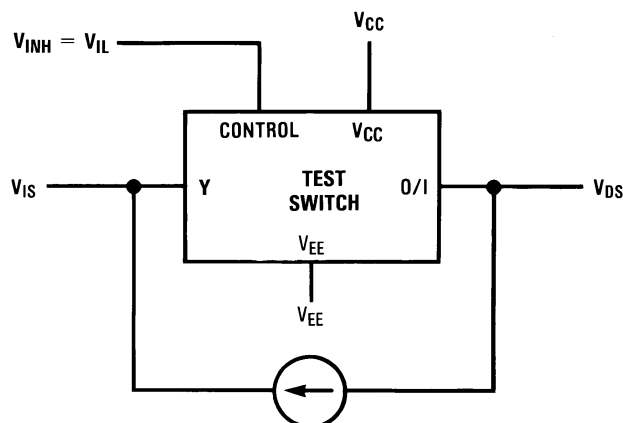


Figure 1. "ON" Resistance

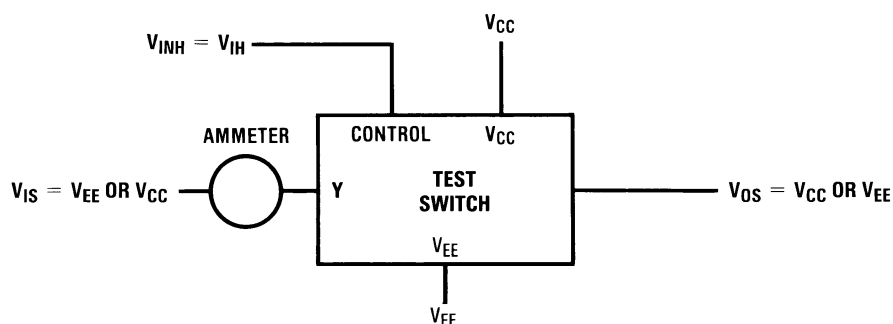


Figure 2. "OFF" Channel Leakage Current

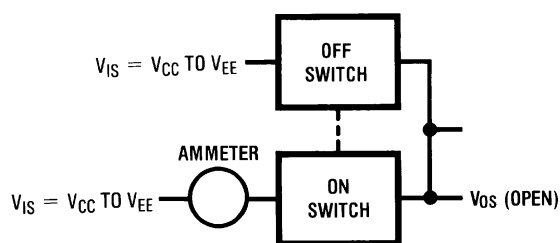


Figure 3. "ON" Channel Leakage Current

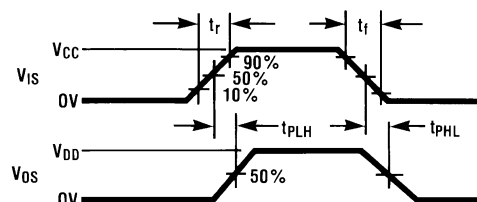
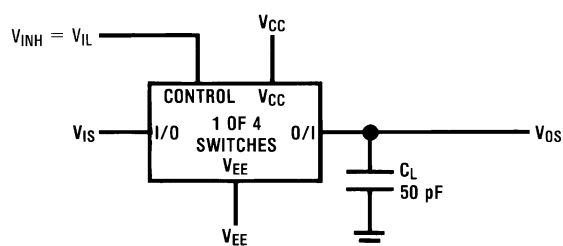


Figure 4.  $t_{PHL}$ ,  $t_{PLH}$  Propagation Delay Time Signal Input to Signal Output

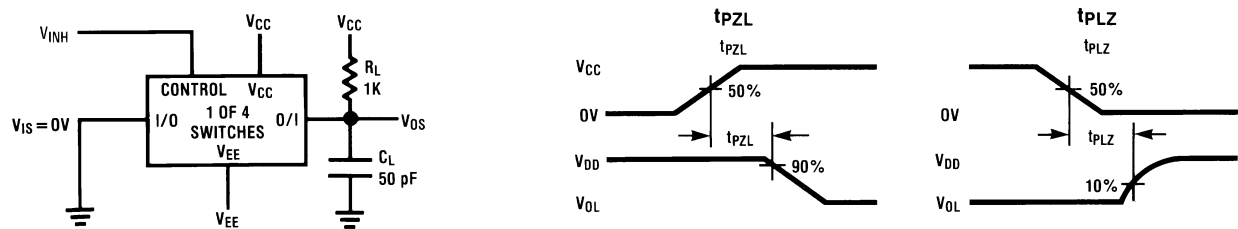


Figure 5. t<sub>PZL</sub>, t<sub>PLZ</sub> Propagation Delay Time Control to Signal Output

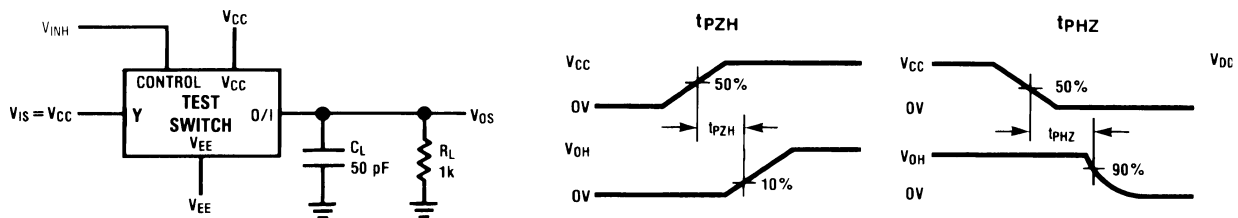


Figure 6. t<sub>PZH</sub>, t<sub>PHZ</sub> Propagation Delay Time Control to Signal Output

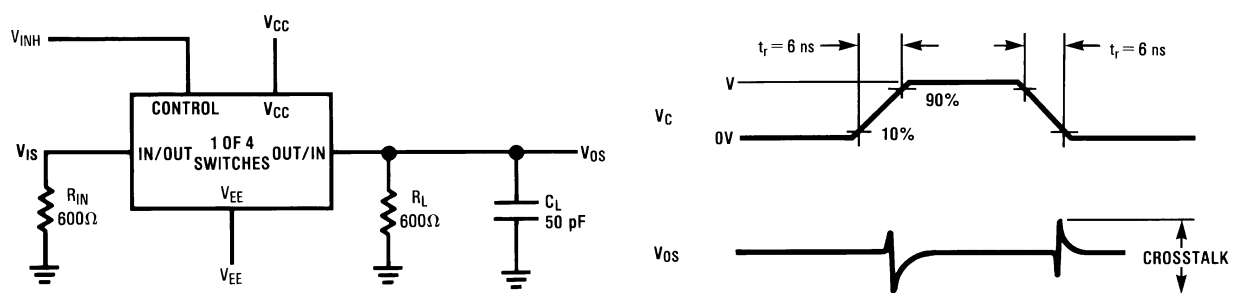


Figure 7. Crosstalk: Control Input to Signal Output

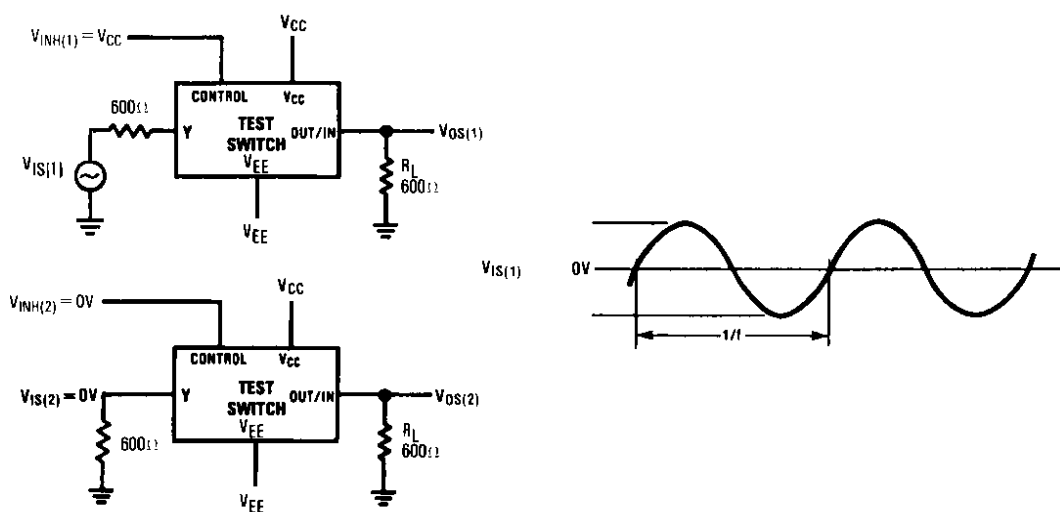
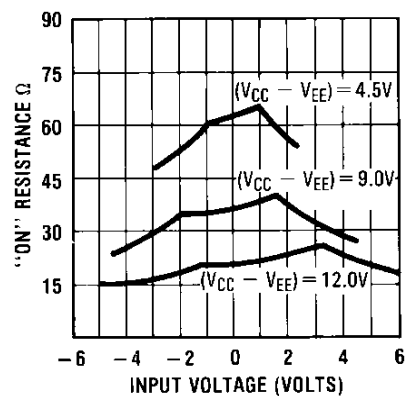


Figure 8. Crosstalk Between Any Two Switches

## Typical Performance Characteristics

Typical "On" Resistance vs Input Voltage



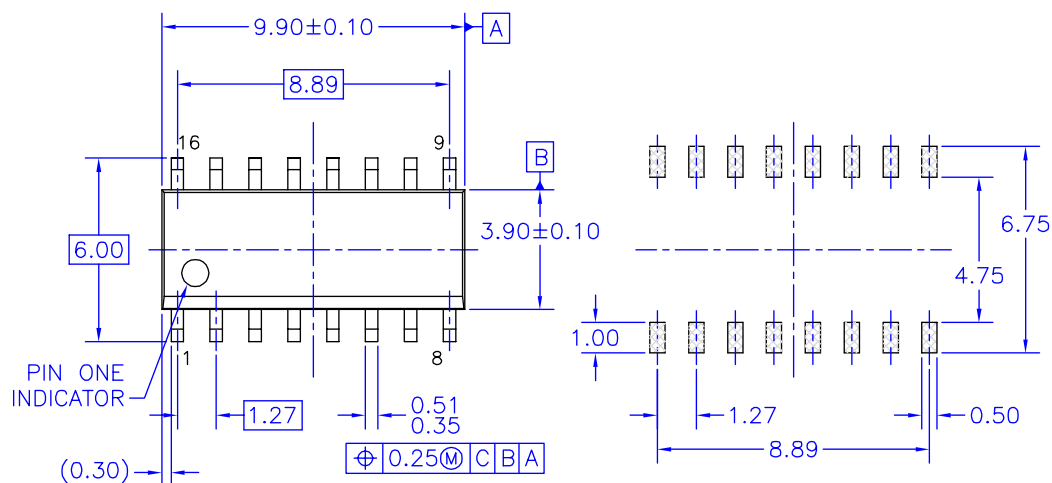
$$V_{CC} = -V_{EE}$$

## Special Considerations

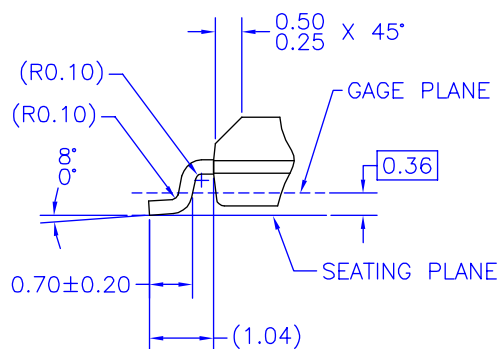
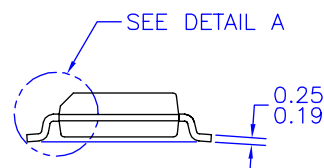
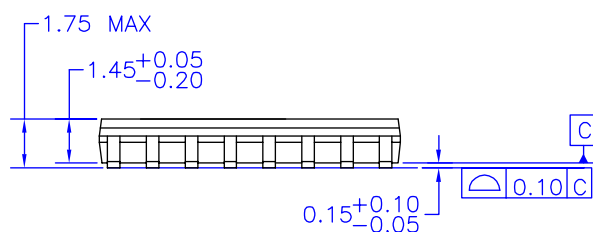
In certain applications the external load-resistor current may include both  $V_{CC}$  and signal line components. To avoid drawing  $V_{CC}$  current when switch current flows into the analog switch pins, the voltage drop across the switch must not exceed 1.2V (calculated from the ON resistance).

## Physical Dimensions

Dimensions are in millimeters unless otherwise noted.



## LAND PATTERN RECOMMENDATION



DETAIL A  
SCALE: 2:1

NOTES: UNLESS OTHERWISE SPECIFIED

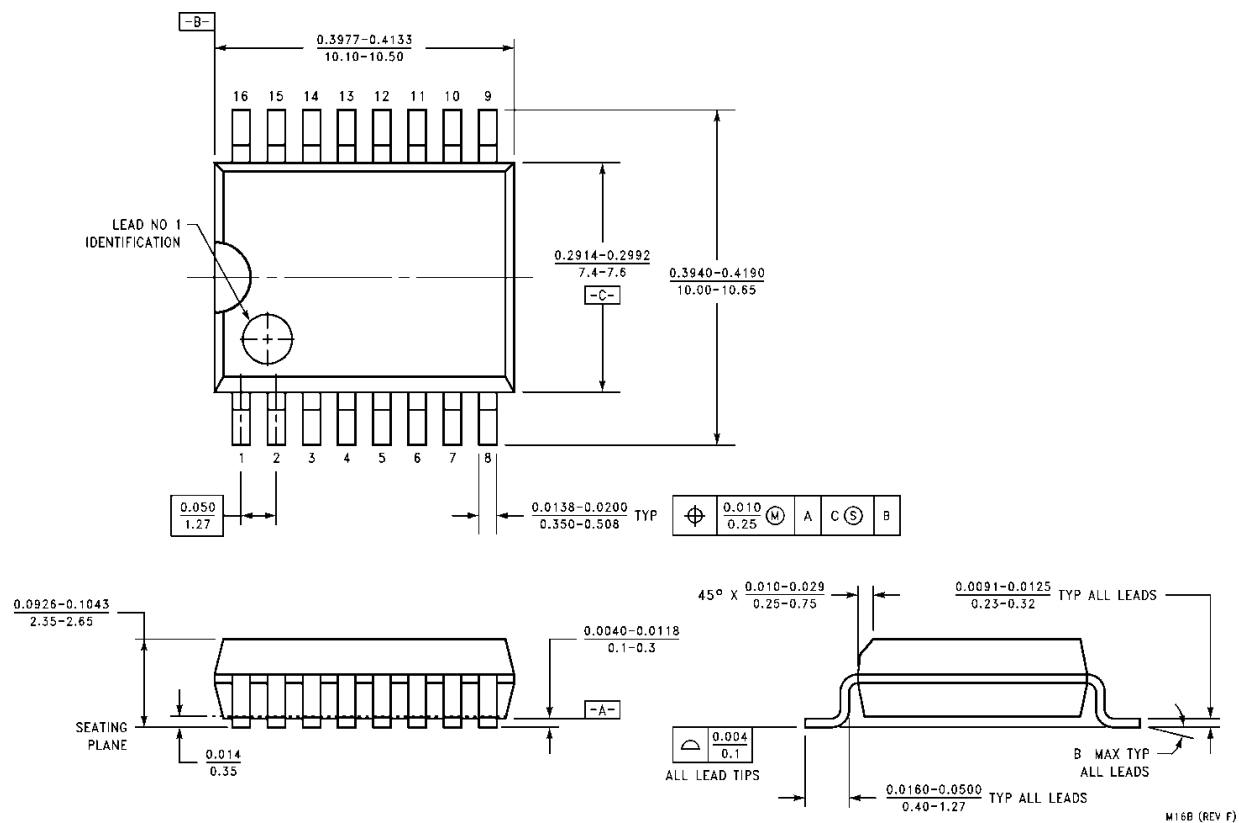
- A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AC, ISSUE C, DATED MAY 1990.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
- D) STANDARD LEAD FINISH:  
200 MICROINCHES / 5.08 MICRONS MIN.  
LEAD/TIN (SOLDER) ON COPPER.

M16AREVK

**Figure 9. 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow  
Package Number M16A**

### Physical Dimensions (Continued)

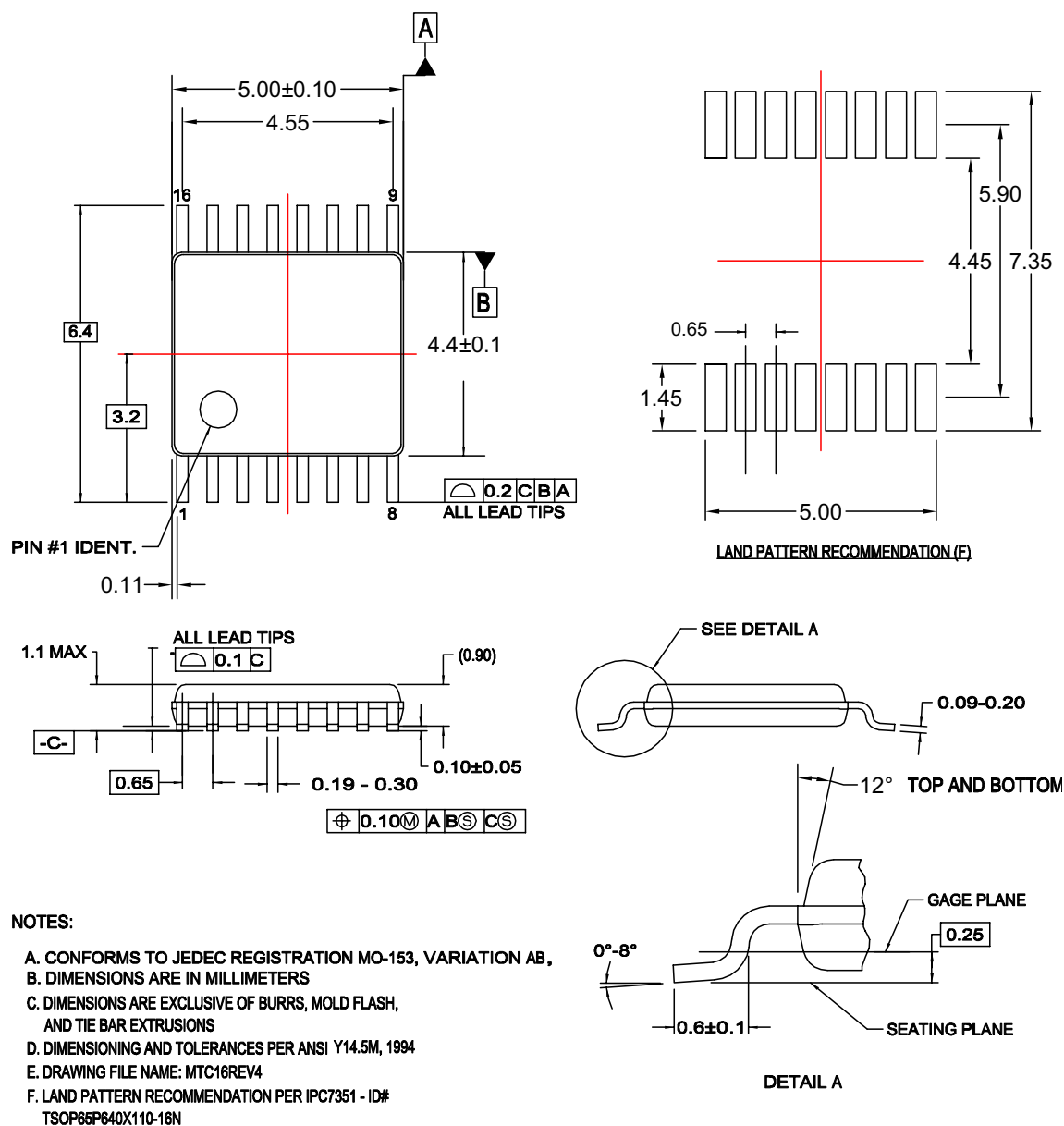
Dimensions are in inches (millimeters) unless otherwise noted.



**Figure 10. 16-Lead Small Outline Intergrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide  
Package Number M16B**

## Physical Dimensions (Continued)

Dimensions are in millimeters unless otherwise noted.



MTC16rev4

Figure 11. 16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide  
Package Number MTC16

## Physical Dimensions (Continued)

Dimensions are in inches (millimeters) unless otherwise noted.

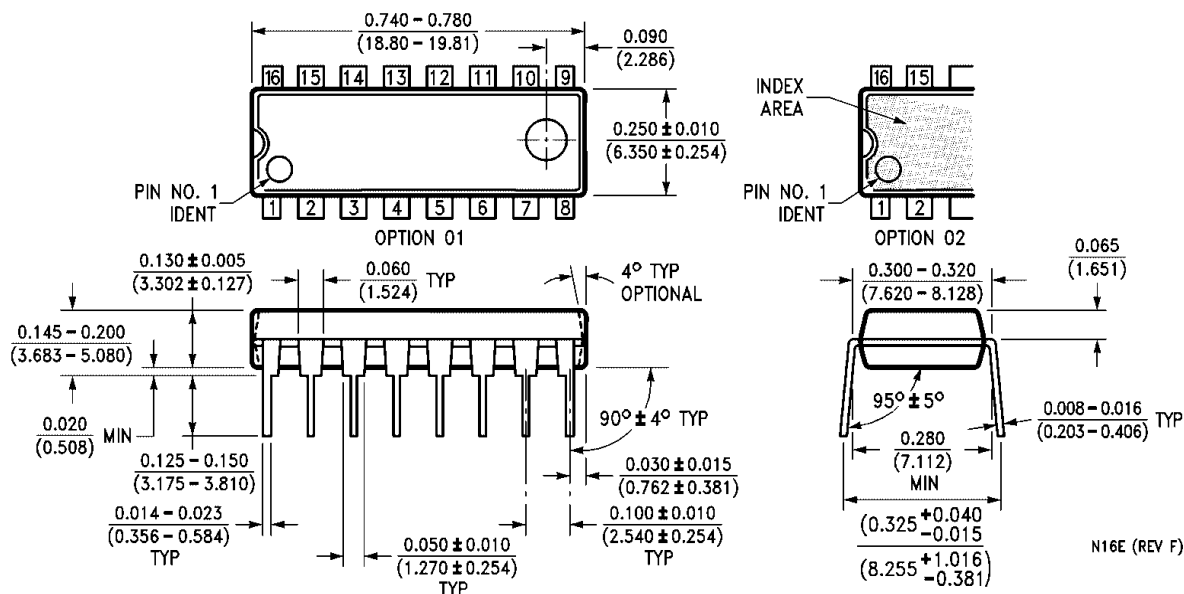


Figure 12. 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide  
Package Number N16E





## TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE <sup>®</sup>	HiSeC <sup>™</sup>	Power-SPM <sup>™</sup>	TinyBuck <sup>™</sup>
Across the board. Around the world.™	<i>i-Lo</i> ™	PowerTrench <sup>®</sup>	TinyLogic <sup>®</sup>
ActiveArray™	ImpliedDisconnect™	Programmable Active Droop™	TINYOPTO™
Bottomless™	IntelliMAX™	QFET <sup>®</sup>	TinyPower™
Build it Now™	ISOPLANAR™	QS™	TinyWire™
CoolFET™	MICROCOUPLER™	QT Optoelectronics™	TruTranslation™
CorePLUS™	MicroPak™	Quiet Series™	μSerDes™
CROSSVOLT™	MICROWIRE™	RapidConfigure™	UHC <sup>®</sup>
CTL™	Motion-SPM™	RapidConnect™	UniFET™
Current Transfer Logic™	MSX™	ScalarPump™	VCX™
DOMETM	MSXPro™	SMART START™	Wire™
E <sup>2</sup> CMS™	OCX™	SPM <sup>®</sup>	
EcoSPARK <sup>®</sup>	OCXPro™	STEALTH™	
EnSigna™	OPTOLOGIC <sup>®</sup>	SuperFET™	
FACT Quiet Series™	OPTOPLANAR <sup>®</sup>	SuperSOT™-3	
FACT <sup>®</sup>	PACMAN™	SuperSOT™-6	
FAST <sup>®</sup>	PDP-SPM™	SuperSOT™-8	
FASTr™	POP™	SyncFET™	
FPS™	Power220 <sup>®</sup>	TCM™	
FRFET <sup>®</sup>	Power247 <sup>®</sup>	The Power Franchise <sup>®</sup>	
GlobalOptoisolator™	PowerEdge™	TM™	
GTO™	PowerSaver™	TinyBoost™	

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

## LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild Semiconductor. The datasheet is printed for reference information only.

Rev. I27

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada

**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910

**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local  
Sales Representative