

# MC14051B, MC14052B, MC14053B



ON Semiconductor®

<http://onsemi.com>

## Analog Multiplexers/Demultiplexers

The MC14051B, MC14052B, and MC14053B analog multiplexers are digitally-controlled analog switches. The MC14051B effectively implements an SP8T solid state switch, the MC14052B a DP4T, and the MC14053B a Triple SPDT. All three devices feature low ON impedance and very low OFF leakage current. Control of analog signals up to the complete supply voltage range can be achieved.

### Features

- Triple Diode Protection on Control Inputs
- Switch Function is Break Before Make
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Analog Voltage Range ( $V_{DD} - V_{EE}$ ) = 3.0 to 18 V  
Note:  $V_{EE}$  must be  $\leq V_{SS}$
- Linearized Transfer Characteristics
- Low-noise – 12 nV/ $\sqrt{\text{Cycle}}$ ,  $f \geq 1.0$  kHz Typical
- Pin-for-Pin Replacement for CD4051, CD4052, and CD4053
- For 4PDT Switch, See MC14551B
- For Lower  $R_{ON}$ , Use the HC4051, HC4052, or HC4053 High-Speed CMOS Devices
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

### MAXIMUM RATINGS (Voltages Referenced to $V_{SS}$ )

Symbol	Parameter	Value	Unit
$V_{DD}$	DC Supply Voltage Range (Referenced to $V_{EE}$ , $V_{SS} \geq V_{EE}$ )	-0.5 to +18.0	V
$V_{in}$ , $V_{out}$	Input or Output Voltage Range (DC or Transient) (Referenced to $V_{SS}$ for Control Inputs and $V_{EE}$ for Switch I/O)	-0.5 to $V_{DD} + 0.5$	V
$I_{in}$	Input Current (DC or Transient) per Control Pin	+10	mA
$I_{SW}$	Switch Through Current	$\pm 25$	mA
$P_D$	Power Dissipation per Package (Note 1)	500	mW
$T_A$	Ambient Temperature Range	-55 to +125	°C
$T_{stg}$	Storage Temperature Range	-65 to +150	°C
$T_L$	Lead Temperature (8-Second Soldering)	260	°C

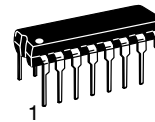
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Temperature Derating: Plastic "P and D/DW" Packages: - 7.0 mW/°C From 65°C To 125°C

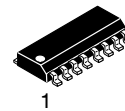
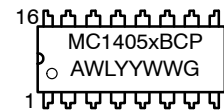
This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation,  $V_{in}$  and  $V_{out}$  should be constrained to the range  $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$ .

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

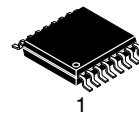
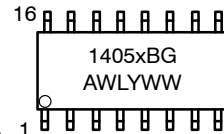
### MARKING DIAGRAMS



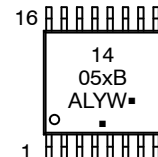
PDIP-16  
P SUFFIX  
CASE 648



SOIC-16  
D SUFFIX  
CASE 751B



TSSOP-16  
DT SUFFIX  
CASE 948F



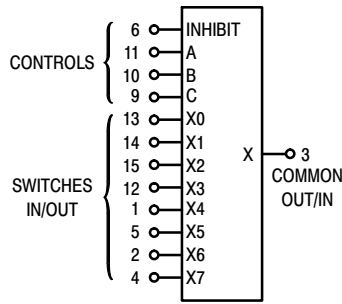
x = 1, 2, or 3  
A = Assembly Location  
WL, L = Wafer Lot  
Y = Year  
WW, W = Work Week  
G or ■ = Pb-Free Package  
(Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 9 of this data sheet.

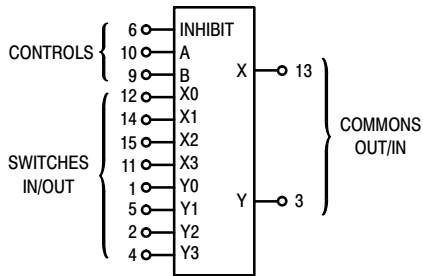
# MC14051B, MC14052B, MC14053B

## MC14051B 8-Channel Analog Multiplexer/Demultiplexer



$V_{DD}$  = PIN 16  
 $V_{SS}$  = PIN 8  
 $V_{EE}$  = PIN 7

## MC14052B Dual 4-Channel Analog Multiplexer/Demultiplexer



$V_{DD}$  = PIN 16  
 $V_{SS}$  = PIN 8  
 $V_{EE}$  = PIN 7

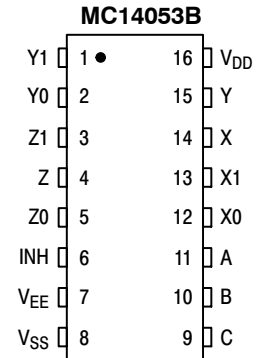
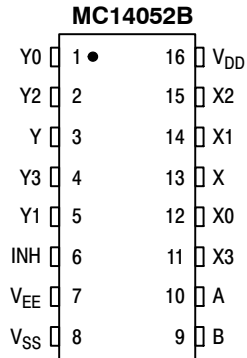
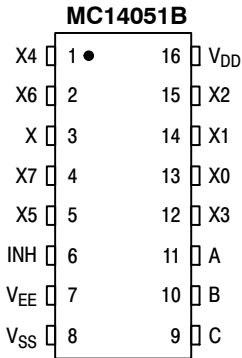
## MC14053B Triple 2-Channel Analog Multiplexer/Demultiplexer



$V_{DD}$  = PIN 16  
 $V_{SS}$  = PIN 8  
 $V_{EE}$  = PIN 7

Note: Control Inputs referenced to  $V_{SS}$ , Analog Inputs and Outputs reference to  $V_{EE}$ .  $V_{EE}$  must be  $\leq V_{SS}$ .

### PIN ASSIGNMENT



# MC14051B, MC14052B, MC14053B

## ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	V <sub>DD</sub>	Test Conditions	- 55°C		25°C			125°C		Unit
				Min	Max	Min	Typ (Note 2)	Max	Min	Max	

### SUPPLY REQUIREMENTS (Voltages Referenced to V<sub>EE</sub>)

Power Supply Voltage Range	V <sub>DD</sub>	-	V <sub>DD</sub> - 3.0 ≥ V <sub>SS</sub> ≥ V <sub>EE</sub>	3.0	18	3.0	-	18	3.0	18	V
Quiescent Current Per Package	I <sub>DD</sub>	5.0	Control Inputs: V <sub>in</sub> = V <sub>SS</sub> or V <sub>DD</sub> , Switch I/O: V <sub>EE</sub> ≤ V <sub>I/O</sub> ≤ V <sub>DD</sub> , and ΔV <sub>switch</sub> ≤ 500 mV (Note 3)	-	5.0	-	0.005	5.0	-	150	μA
		10		-	10	-	0.010	10	-	300	
		15		-	20	-	0.015	20	-	600	
Total Supply Current (Dynamic Plus Quiescent, Per Package)	I <sub>D(AV)</sub>	5.0 10 15	T <sub>A</sub> = 25°C only (The channel component, (V <sub>in</sub> - V <sub>out</sub> )/R <sub>on</sub> , is not included.)	Typical			(0.07 μA/kHz) f + I <sub>DD</sub> (0.20 μA/kHz) f + I <sub>DD</sub> (0.36 μA/kHz) f + I <sub>DD</sub>			μA	

### CONTROL INPUTS — INHIBIT, A, B, C (Voltages Referenced to V<sub>SS</sub>)

Low-Level Input Voltage	V <sub>IL</sub>	5.0	R <sub>on</sub> = per spec, I <sub>off</sub> = per spec	-	1.5	-	2.25	1.5	-	1.5	V
		10		-	3.0	-	4.50	3.0	-	3.0	
		15		-	4.0	-	6.75	4.0	-	4.0	
High-Level Input Voltage	V <sub>IH</sub>	5.0	R <sub>on</sub> = per spec, I <sub>off</sub> = per spec	3.5	-	3.5	2.75	-	3.5	-	V
		10		7.0	-	7.0	5.50	-	7.0	-	
		15		11	-	11	8.25	-	11	-	
Input Leakage Current	I <sub>in</sub>	15	V <sub>in</sub> = 0 or V <sub>DD</sub>	-	± 0.1	-	± 0.00001	± 0.1	-	1.0	μA
Input Capacitance	C <sub>in</sub>	-		-	-	-	5.0	7.5	-	-	pF

### SWITCHES IN/OUT AND COMMONS OUT/IN — X, Y, Z (Voltages Referenced to V<sub>EE</sub>)

Recommended Peak-to-Peak Voltage Into or Out of the Switch	V <sub>I/O</sub>	-	Channel On or Off	0	V <sub>DD</sub>	0	-	V <sub>DD</sub>	0	V <sub>DD</sub>	V <sub>PP</sub>
Recommended Static or Dynamic Voltage Across the Switch (Note 3) (Figure 5)	ΔV <sub>switch</sub>	-	Channel On	0	600	0	-	600	0	300	mV
Output Offset Voltage	V <sub>OO</sub>	-	V <sub>in</sub> = 0 V, No Load	-	-	-	10	-	-	-	μV
ON Resistance	R <sub>on</sub>	5.0	ΔV <sub>switch</sub> ≤ 500 mV (Note 3) V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub> (Control), and V <sub>in</sub> = 0 to V <sub>DD</sub> (Switch)	-	800	-	250	1050	-	1200	Ω
		10		-	400	-	120	500	-	520	
		15		-	220	-	80	280	-	300	
ΔON Resistance Between Any Two Channels in the Same Package	ΔR <sub>on</sub>	5.0		-	70	-	25	70	-	135	Ω
		10		-	50	-	10	50	-	95	
		15		-	45	-	10	45	-	65	
Off-Channel Leakage Current (Figure 10)	I <sub>off</sub>	15	V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub> (Control) Channel to Channel or Any One Channel	-	± 100	-	± 0.05	± 100	-	± 1000	nA
Capacitance, Switch I/O	C <sub>I/O</sub>	-	Inhibit = V <sub>DD</sub>	-	-	-	10	-	-	-	pF
Capacitance, Common O/I	C <sub>O/I</sub>	-	Inhibit = V <sub>DD</sub> (MC14051B) (MC14052B) (MC14053B)	-	-	-	60	-	-	-	pF
				-	-	-	32	-	-	-	
				-	-	-	17	-	-	-	
Capacitance, Feedthrough (Channel Off)	C <sub>I/O</sub>	-	Pins Not Adjacent Pins Adjacent	-	-	-	0.15	-	-	-	pF
				-	-	-	0.47	-	-	-	

2. Data labeled "Typ" is not to be used for design purposes, but is intended as an indication of the IC's potential performance.

3. For voltage drops across the switch (ΔV<sub>switch</sub>) > 600 mV (> 300 mV at high temperature), excessive V<sub>DD</sub> current may be drawn, i.e. the current out of the switch may contain both V<sub>DD</sub> and switch input components. The reliability of the device will be unaffected unless the Maximum Ratings are exceeded. (See first page of this data sheet.)

# MC14051B, MC14052B, MC14053B

## ELECTRICAL CHARACTERISTICS (Note 4) ( $C_L = 50 \text{ pF}$ , $T_A = 25^\circ\text{C}$ ) ( $V_{EE} \leq V_{SS}$ unless otherwise indicated)

Characteristic	Symbol	$V_{DD} - V_{EE}$ Vdc	Typ (Note 5) All Types	Max	Unit
Propagation Delay Times (Figure 6) Switch Input to Switch Output ( $R_L = 1 \text{ k}\Omega$ ) MC14051 $t_{PLH}, t_{PHL} = (0.17 \text{ ns/pF}) C_L + 26.5 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.08 \text{ ns/pF}) C_L + 11 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.06 \text{ ns/pF}) C_L + 9.0 \text{ ns}$ MC14052 $t_{PLH}, t_{PHL} = (0.17 \text{ ns/pF}) C_L + 21.5 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.08 \text{ ns/pF}) C_L + 8.0 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.06 \text{ ns/pF}) C_L + 7.0 \text{ ns}$ MC14053 $t_{PLH}, t_{PHL} = (0.17 \text{ ns/pF}) C_L + 16.5 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.08 \text{ ns/pF}) C_L + 4.0 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.06 \text{ ns/pF}) C_L + 3.0 \text{ ns}$	$t_{PLH}, t_{PHL}$	5.0	35	90	ns
		10	15	40	
		15	12	30	
		5.0	30	75	ns
		10	12	30	
		15	10	25	
		5.0	25	65	ns
		10	8.0	20	
		15	6.0	15	
Inhibit to Output ( $R_L = 10 \text{ k}\Omega$ , $V_{EE} = V_{SS}$ ) Output "1" or "0" to High Impedance, or High Impedance to "1" or "0" Level MC14051B  MC14052B  MC14053B	$t_{PHZ}, t_{PLZ},$ $t_{PZH}, t_{PZL}$	5.0	350	700	ns
		10	170	340	
		15	140	280	
		5.0	300	600	ns
		10	155	310	
		15	125	250	
		5.0	275	550	ns
		10	140	280	
		15	110	220	
Control Input to Output ( $R_L = 1 \text{ k}\Omega$ , $V_{EE} = V_{SS}$ ) MC14051B  MC14052B  MC14053B	$t_{PLH}, t_{PHL}$	5.0	360	720	ns
		10	160	320	
		15	120	240	
		5.0	325	650	ns
		10	130	260	
		15	90	180	
		5.0	300	600	ns
		10	120	240	
		15	80	160	
Second Harmonic Distortion ( $R_L = 10 \text{ k}\Omega$ , $f = 1 \text{ kHz}$ ) $V_{in} = 5 V_{PP}$	-	10	0.07	-	%
Bandwidth (Figure 7) ( $R_L = 50 \Omega$ , $V_{in} = 1/2 (V_{DD} - V_{EE})$ p-p, $C_L = 50 \text{ pF}$ $20 \text{ Log } (V_{out}/V_{in}) = -3 \text{ dB}$ )	BW	10	17	-	MHz
Off Channel Feedthrough Attenuation (Figure 7) $R_L = 1 \text{ k}\Omega$ , $V_{in} = 1/2 (V_{DD} - V_{EE})$ p-p $f_{in} = 4.5 \text{ MHz}$ — MC14051B $f_{in} = 30 \text{ MHz}$ — MC14052B $f_{in} = 55 \text{ MHz}$ — MC14053B	-	10	-50	-	dB
Channel Separation (Figure 8) ( $R_L = 1 \text{ k}\Omega$ , $V_{in} = 1/2 (V_{DD} - V_{EE})$ p-p, $f_{in} = 3.0 \text{ MHz}$ )	-	10	-50	-	dB
Crosstalk, Control Input to Common O/I (Figure 9) ( $R_1 = 1 \text{ k}\Omega$ , $R_L = 10 \text{ k}\Omega$ Control $t_{TLH} = t_{THL} = 20 \text{ ns}$ , Inhibit = $V_{SS}$ )	-	10	75	-	mV

4. The formulas given are for the typical characteristics only at  $25^\circ\text{C}$ .

5. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

# MC14051B, MC14052B, MC14053B

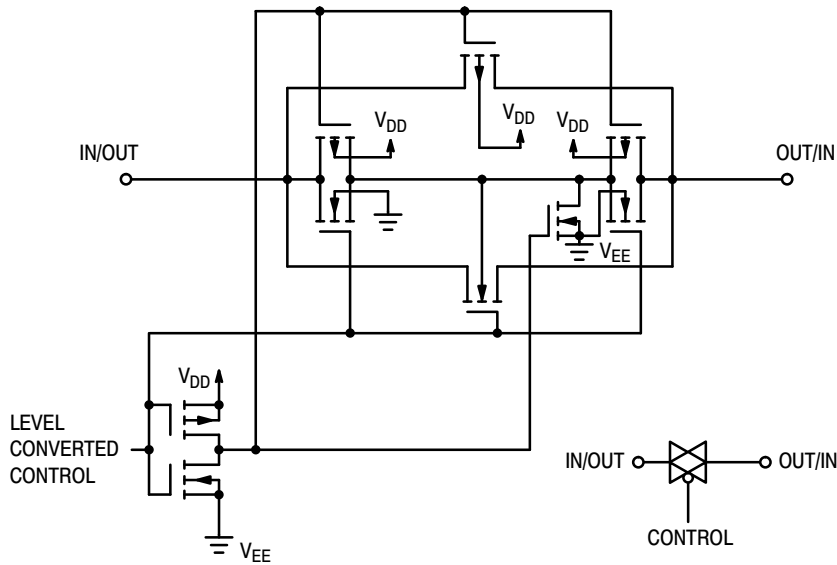


Figure 1. Switch Circuit Schematic

## TRUTH TABLE

Control Inputs			ON Switches		
Inhibit	Select		MC14051B	MC14052B	MC14053B
	C*	B A			
0	0	0 0	X0	Y0 X0	Z0 Y0 X0
0	0	0 1	X1	Y1 X1	Z0 Y0 X1
0	0	1 0	X2	Y2 X2	Z0 Y1 X0
0	0	1 1	X3	Y3 X3	Z0 Y1 X1
0	1	0 0	X4		Z1 Y0 X0
0	1	0 1	X5		Z1 Y0 X1
0	1	1 0	X6		Z1 Y1 X0
0	1	1 1	X7		Z1 Y1 X1
1	x	x x	None	None	None

\*Not applicable for MC14052  
x = Don't Care



Figure 2. MC14051B Functional Diagram

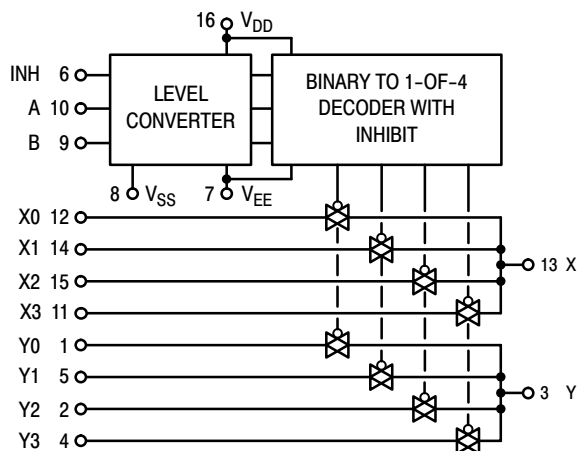


Figure 3. MC14052B Functional Diagram

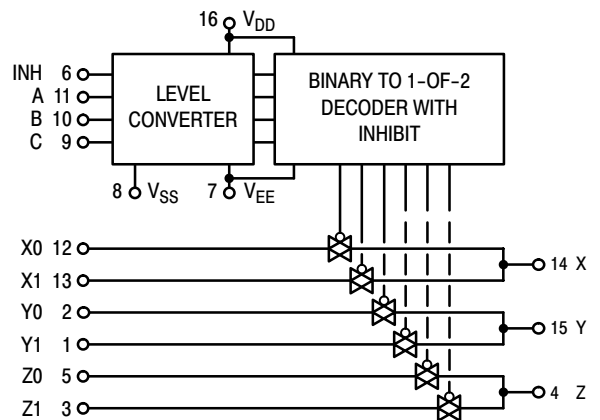


Figure 4. MC14053B Functional Diagram

TEST CIRCUITS



Figure 5.  $\Delta V$  Across Switch



Figure 6. Propagation Delay Times, Control and Inhibit to Output

A, B, and C inputs used to turn ON or OFF the switch under test.

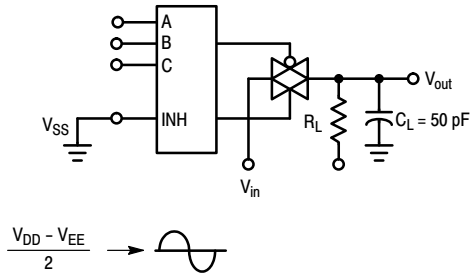


Figure 7. Bandwidth and Off-Channel Feedthrough Attenuation



Figure 8. Channel Separation (Adjacent Channels Used For Setup)



Figure 9. Crosstalk, Control Input to Common O/I



Figure 10. Off Channel Leakage

NOTE: See also Figures 7 and 8 in the MC14016B data sheet.

# MC14051B, MC14052B, MC14053B

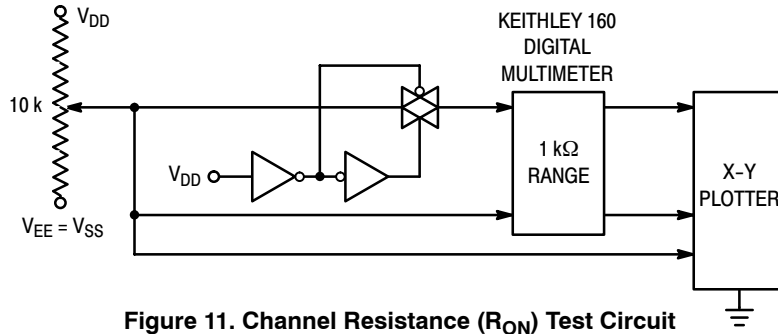


Figure 11. Channel Resistance ( $R_{ON}$ ) Test Circuit

## TYPICAL RESISTANCE CHARACTERISTICS



Figure 12.  $V_{DD} = 7.5\text{ V}$ ,  $V_{EE} = -7.5\text{ V}$



Figure 13.  $V_{DD} = 5.0\text{ V}$ ,  $V_{EE} = -5.0\text{ V}$



Figure 14.  $V_{DD} = 2.5\text{ V}$ ,  $V_{EE} = -2.5\text{ V}$



Figure 15. Comparison at  $25^\circ\text{C}$ ,  $V_{DD} = -V_{EE}$

APPLICATIONS INFORMATION

Figure A illustrates use of the on-chip level converter detailed in Figures 2, 3, and 4. The 0-to-5 V Digital Control signal is used to directly control a 9 V<sub>p-p</sub> analog signal.

The digital control logic levels are determined by V<sub>DD</sub> and V<sub>SS</sub>. The V<sub>DD</sub> voltage is the logic high voltage; the V<sub>SS</sub> voltage is logic low. For the example, V<sub>DD</sub> = +5 V = logic high at the control inputs; V<sub>SS</sub> = GND = 0 V = logic low.

The maximum analog signal level is determined by V<sub>DD</sub> and V<sub>EE</sub>. The V<sub>DD</sub> voltage determines the maximum recommended peak above V<sub>SS</sub>. The V<sub>EE</sub> voltage determines the maximum swing below V<sub>SS</sub>. For the example, V<sub>DD</sub> - V<sub>SS</sub> = 5 V maximum swing above V<sub>SS</sub>; V<sub>SS</sub> - V<sub>EE</sub> = 5 V maximum swing below V<sub>SS</sub>. The example shows a ±4.5 V signal which allows a 1/2 volt margin at each

peak. If voltage transients above V<sub>DD</sub> and/or below V<sub>EE</sub> are anticipated on the analog channels, external diodes (D<sub>x</sub>) are recommended as shown in Figure B. These diodes should be small signal types able to absorb the maximum anticipated current surges during clipping.

The *absolute* maximum potential difference between V<sub>DD</sub> and V<sub>EE</sub> is 18.0 V. Most parameters are specified up to 15 V which is the *recommended* maximum difference between V<sub>DD</sub> and V<sub>EE</sub>.

Balanced supplies are not required. However, V<sub>SS</sub> must be greater than or equal to V<sub>EE</sub>. For example, V<sub>DD</sub> = +10 V, V<sub>SS</sub> = +5 V, and V<sub>EE</sub> = -3 V is acceptable. See the Table below.



Figure A. Application Example

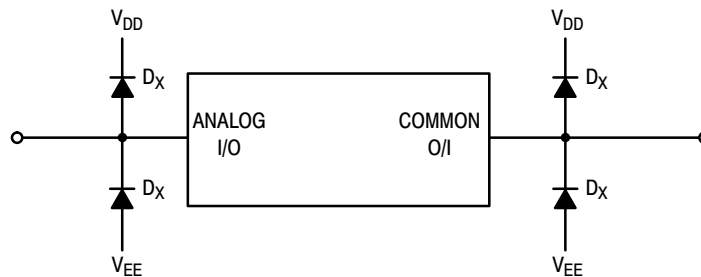


Figure B. External Germanium or Schottky Clipping Diodes

POSSIBLE SUPPLY CONNECTIONS

V <sub>DD</sub> In Volts	V <sub>SS</sub> In Volts	V <sub>EE</sub> In Volts	Control Inputs Logic High/Logic Low In Volts	Maximum Analog Signal Range In Volts
+ 8	0	- 8	+ 8/0	+ 8 to - 8 = 16 V <sub>p-p</sub>
+ 5	0	- 12	+ 5/0	+ 5 to - 12 = 17 V <sub>p-p</sub>
+ 5	0	0	+ 5/0	+ 5 to 0 = 5 V <sub>p-p</sub>
+ 5	0	- 5	+ 5/0	+ 5 to - 5 = 10 V <sub>p-p</sub>
+ 10	+ 5	- 5	+ 10/ + 5	+ 10 to - 5 = 15 V <sub>p-p</sub>



## MC14051B, MC14052B, MC14053B

### ORDERING INFORMATION

Device	Package	Shipping†
MC14051BCPG	PDIP-16 (Pb-Free)	500 Units / Rail
NLV14051BCPG*		500 Units / Rail
MC14051BDG	SOIC-16 (Pb-Free)	48 Units / Rail
NLV14051BDG*		48 Units / Rail
MC14051BDR2G		2500 / Tape & Reel
NLV14051BDR2G*		2500 / Tape & Reel
MC14051BDTR2G	TSSOP-16 (Pb-Free)	2500 / Tape & Reel
NLV14051BDTR2G*		2500 / Tape & Reel
MC14052BCPG	PDIP-16 (Pb-Free)	500 Units / Rail
NLV14052BCPG*		500 Units / Rail
MC14052BDG	SOIC-16 (Pb-Free)	48 Units / Rail
NLV14052BDG*		48 Units / Rail
MC14052BDR2G		2500 / Tape & Reel
NLV14052BDR2G*		2500 / Tape & Reel
MC14052BDTR2G	TSSOP-16 (Pb-Free)	2500 / Tape & Reel
NLV14052BDTR2G*		2500 / Tape & Reel
MC14053BCPG	PDIP-16 (Pb-Free)	500 Units / Rail
NLV14053BCPG*		500 Units / Rail
MC14053BDG	SOIC-16 (Pb-Free)	48 Units / Rail
NLV14053BDG*		48 Units / Rail
MC14053BDR2G		2500 / Tape & Reel
NLV14053BDR2G*		2500 / Tape & Reel
MC14053BDTR2G	TSSOP-16 (Pb-Free)	2500 / Tape & Reel
NLV14053BDTR2G*		2500 / Tape & Reel

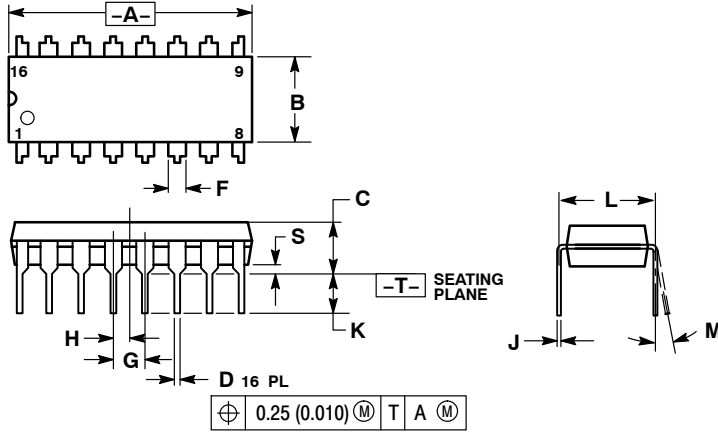
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

# MC14051B, MC14052B, MC14053B

## PACKAGE DIMENSIONS

PDIP-16  
P SUFFIX  
CASE 648-08  
ISSUE T



NOTES:

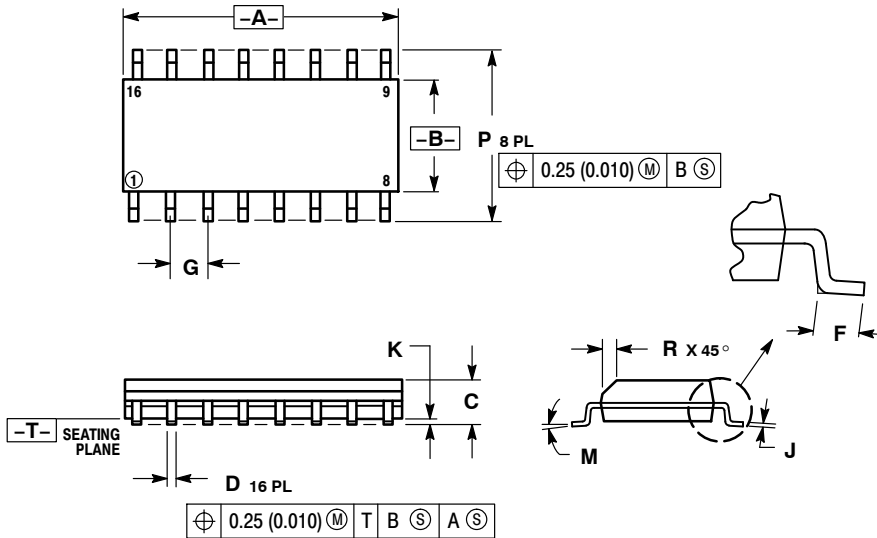
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.740	0.770	18.80	19.55
B	0.250	0.270	6.35	6.85
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.040	0.70	1.02	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.130	2.80	3.30
L	0.295	0.305	7.50	7.74
M	0 <sup>o</sup>	10 <sup>o</sup>	0 <sup>o</sup>	10 <sup>o</sup>
S	0.020	0.040	0.51	1.01

# MC14051B, MC14052B, MC14053B

## PACKAGE DIMENSIONS

SOIC-16  
D SUFFIX  
CASE 751B-05  
ISSUE K



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

### SOLDERING FOOTPRINT\*



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

# MC14051B, MC14052B, MC14053B

## PACKAGE DIMENSIONS

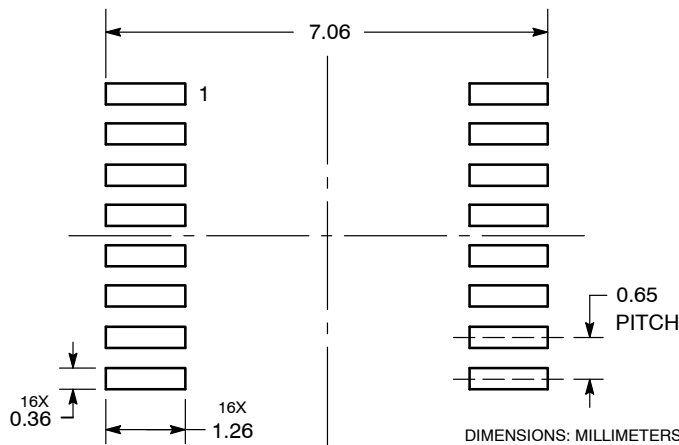
TSSOP-16  
DT SUFFIX  
CASE 948F  
ISSUE B



### 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°



**ON Semiconductor** and **ON** are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC'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). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC 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  
P.O. Box 5163, Denver, Colorado 80217 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



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.