

DESCRIPTION

The CD4052BM96-CN analog multiplexers and demultiplexers are digitally-controlled analog switches having low ON impedance and very low OFF leakage current. These multiplexer circuits dissipate extremely low quiescent power over the full VDD-VSS and VDD-GND supply-voltage ranges, independent of the logic state of the control signals.

The CD4052BM96-CN is available in a SOP16 package.

FEATURES

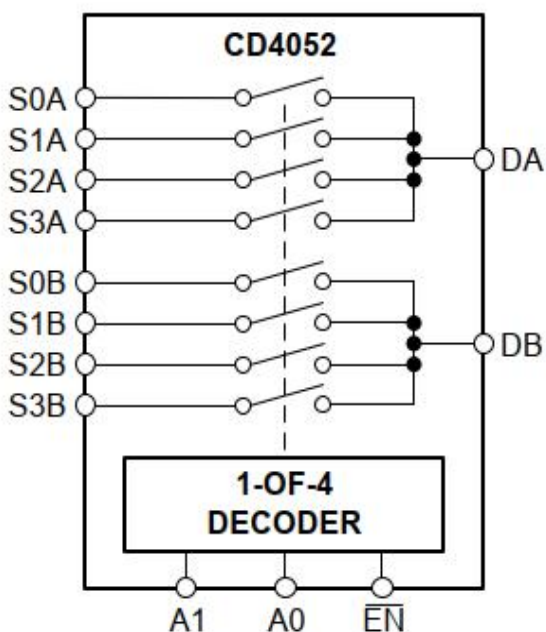
- Wide Supply voltage Range from 3V to15V

- Break-before-make switching
- Low on-state resistance:
 $R_{ON}=100\Omega(VDD-VSS=15V)$
- Very low static power consumption and high off-state resistance
- Analogue switch on-resistance difference:
 $\Delta R_{ON}=5\Omega(VDD-VSS=15V)$

APPLICATIONS

- Analog multiplexing and demultiplexing
- Digital multiplexing and demultiplexing
- Factory automation and control
- Appliances
- Building automation

Simplified Schematic

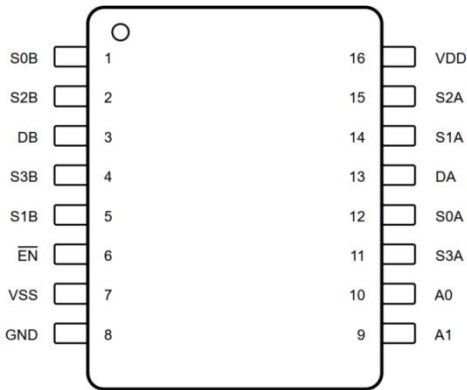


Function Table

INPUT			Channel ON
$\overline{EN}$	A2	A1	
0	0	0	S0A to DA S0B to DB
0	0	1	S1A to DA S1B to DB
0	1	0	S2A to DA S2B to DB
0	1	1	S3A to DA S3B to DB
1	X	X	None

Note: X= Don't care

Pin Configuration

Pin No	Pin name	Description	Pin Diagram
1	S0B	independent input or output	
2	S2B	independent input or output	
3	DB	common output or input	
4	S3B	independent input or output	
5	S1B	independent input or output	
6	$\overline{EN}$	enable input(active low)	
7	VSS	supply voltage	
8	GND	ground	
9	A1	select input	
10	A0	select input	
11	S3A	independent input or output	
12	S0A	independent input or output	
13	DA	common output or input	
14	S1A	independent input or output	
15	S2A	independent input or output	
16	VDD	supply voltage	

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)

PARAMETER	MIN	MAX	UNIT
Supply Voltage		18	V
Input voltage		$V_{DD}+0.5$	V
Input current		± 10	mA
Maximum Junction Temperature		+150	°C
Storage Temperature Range	-65	+150	°C
Lead Temperature(soldering, 10sec)		+260	°C

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

PARAMETER	MIN	TYP	MAX	UNIT
Supply Voltage	3		15	V
Input voltage	0		V_{DD}	V
Operating Temperature Range	-20	+25	+85	°C

Electrical Characteristics

(At $T_A=+25^{\circ}\text{C}$, $V_{SS}=0\text{V}$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Supply Current	I_{DD}	$V_{DD}=5\text{V}$		0	-	5	μA
		$V_{DD}=10\text{V}$		0	-	10	
		$V_{DD}=15\text{V}$		0	-	20	
ON resistance	R_{ON}	$V_{DD}=2.5\text{V}$, $V_{SS}=-2.5\text{V}$, or $V_{DD}=5\text{V}$, $V_{SS}=0\text{V}$		-	270	1050	Ω
		$V_{DD}=5\text{V}$, $V_{SS}=-5\text{V}$, or $V_{DD}=10\text{V}$, $V_{SS}=0\text{V}$		-	120	400	
		$V_{DD}=7.5\text{V}$, $V_{SS}=-7.5\text{V}$, or $V_{DD}=15\text{V}$, $V_{SS}=0\text{V}$		-	100	240	
ON resistance mismatch between channels	ΔR_{on}	$V_{DD}=2.5\text{V}$, $V_{SS}=-2.5\text{V}$, or $V_{DD}=5\text{V}$, $V_{SS}=0\text{V}$		-	10	-	Ω
		$V_{DD}=5\text{V}$, $V_{SS}=-5\text{V}$, or $V_{DD}=10\text{V}$, $V_{SS}=0\text{V}$		-	10	-	
		$V_{DD}=7.5\text{V}$, $V_{SS}=-7.5\text{V}$, or $V_{DD}=15\text{V}$, $V_{SS}=0\text{V}$		-	5	-	
OFF Channel Leakage Current Any Channel OFF	I_{OFF}	$V_{DD}=7.5\text{V}$, $V_{SS}=-7.5\text{V}$, $O/I=\pm 7.5\text{V}$, $I/O=0\text{V}$		-	± 0.01	± 50	nA
OFF Channel Leakage Current ALL Channels OFF		$\overline{\text{EN}}=7.5\text{V}$		-	± 0.04	± 200	nA
Input Low Voltage	V_{IL}	$ I_O < 1\mu\text{A}$	$V_{DD}=5\text{V}$	-	-	1.5	V
			$V_{DD}=10\text{V}$	-	-	3.0	
			$V_{DD}=15\text{V}$	-	-	4.0	
Input High Voltage	V_{IH}	$ I_O < 1\mu\text{A}$	$V_{DD}=5\text{V}$	3.5	-	-	V
			$V_{DD}=10\text{V}$	7	-	-	
			$V_{DD}=15\text{V}$	11	-	-	
Input current	I_{IN}	$V_{IN}=0\text{V}$	$V_{DD}=15\text{V}$	-	-10^{-5}	-0.3	μA
		$V_{IN}=15\text{V}$		-	10^{-5}	0.3	

AC Performance Characteristics

(At $T_A=+25^{\circ}\text{C}$, $V_{SS}=0\text{V}$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Propagation Delay Time (open channel)	t_{PZH} t_{PZL}	$R_L=1\text{K}\Omega$, $C_L=50\text{pF}$	$V_{DD}=5\text{V}$	-	-	1200	ns
			$V_{DD}=10\text{V}$	-	-	450	
			$V_{DD}=15\text{V}$	-	-	320	
Propagation Delay Time (off channel)	t_{PHZ} t_{PLZ}	$R_L=1\text{K}\Omega$, $C_L=50\text{pF}$	$V_{DD}=5\text{V}$	-	-	420	ns
			$V_{DD}=10\text{V}$	-	-	200	
			$V_{DD}=15\text{V}$	-	-	150	

Input capacitance	C_{IN}	-	$V_{DD}=10V$	-	-	7.5	pF
Output capacitance	C_{out}	-	$V_{DD}=10V$	-	15	-	pF
Bypass Capacitors	C_{IOS}	-	$V_{DD}=10V$	-	0.2	-	pF
Power Dissipation Capacitors	C_{PO}	-	$V_{DD}=10V$	-	140	-	pF
Sine Wave Distortion		$R_L=10K\Omega$, $f_{IS}=1KHz$, $V_{IS}=5V_{pp}$, $V_{SI}=0V$	$V_{DD}=10V$	-	0.04	-	%
Sine Wave Frequency Response		$R_L=1K\Omega$, $V_{IS}=5V_{pp}$, $20\log_{10}(V_{OS}/V_{IS})=-40dB$	$V_{DD}=10V$	-	40	-	MHz
Off-state Crosstalk Frequency		$R_L=1K\Omega$, $V_{IS}=5V_{pp}$, $20\log_{10}(V_{OS}/V_{IS})=-40dB$	$V_{DD}=10V$	-	10	-	MHz
Signal Crosstalk Frequency		$R_L=1K\Omega$, $V_{IS}=5V_{pp}$, $20\log_{10}(V_{OS}/V_{IS})=-40dB$	$V_{DD}=10V$	-	3	-	MHz
Signal input to output Propagation Delay	t_{PHL} t_{PLH}	$C_L=50pF$	$V_{DD}=5V$	-	25	55	ns
			$V_{DD}=10V$	-	15	35	
			$V_{DD}=15V$	-	10	25	
Control input to signal response		$R_L=10K\Omega$	$V_{DD}=10V$	-	65	-	ns
Propagation delay time From addressing to signal output Channel is on or off	t_{PHL} t_{PLH}	$C_L=50pF$	$V_{DD}=5V$	-	300	1000	ns
			$V_{DD}=10V$	-	100	350	
			$V_{DD}=15V$	-	70	240	

Parameter Measurement Information

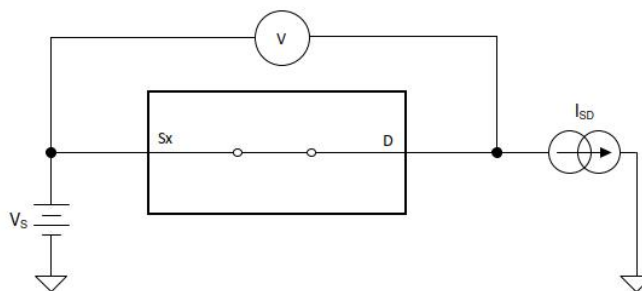


Figure 1. On-Resistance Measurement Setup

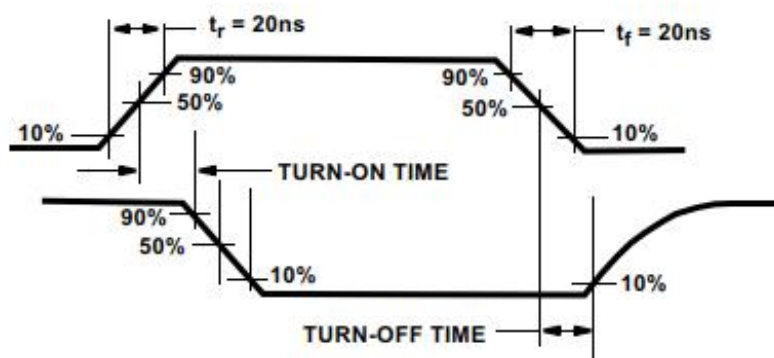


Figure 2. Waveforms, Channel Being Turned ON($R_L = 1 k\Omega$)

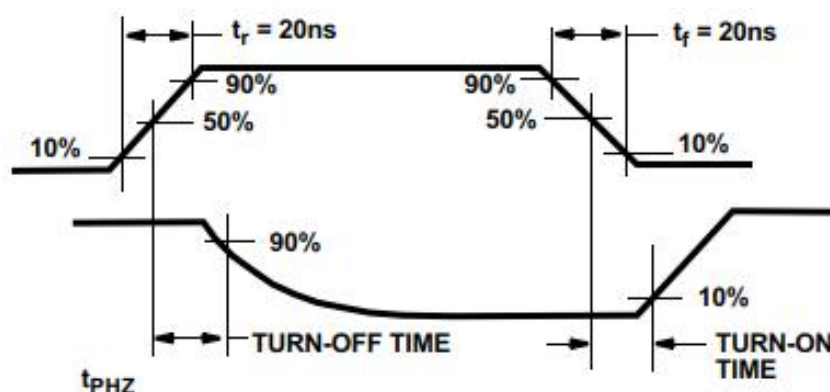


Figure 3. Waveforms, Channel Being Turned OFF($R_L = 1\text{ k}\Omega$)

Typical Application

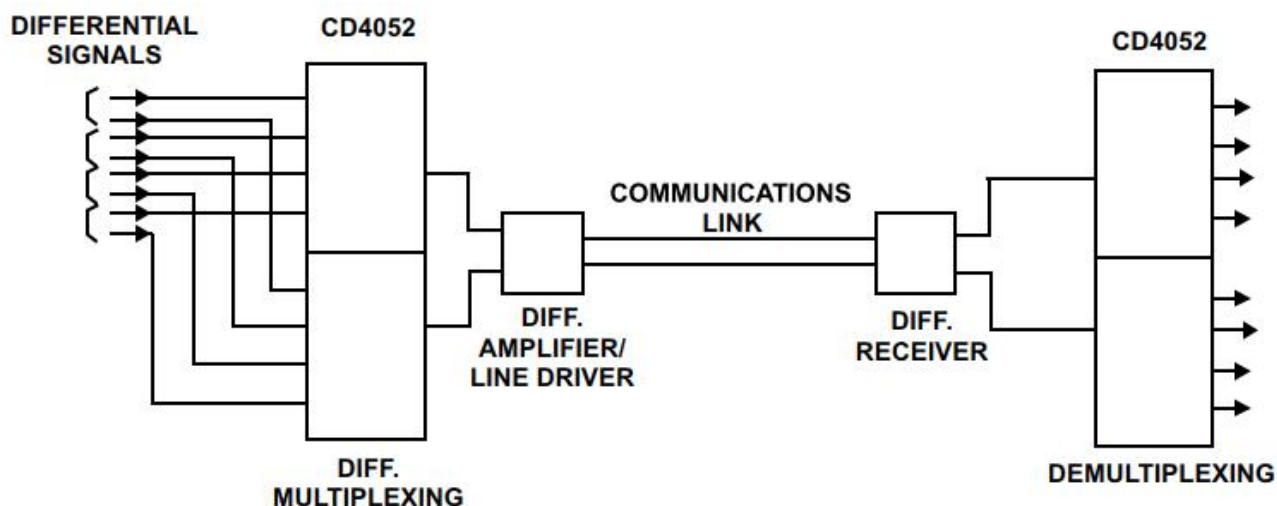
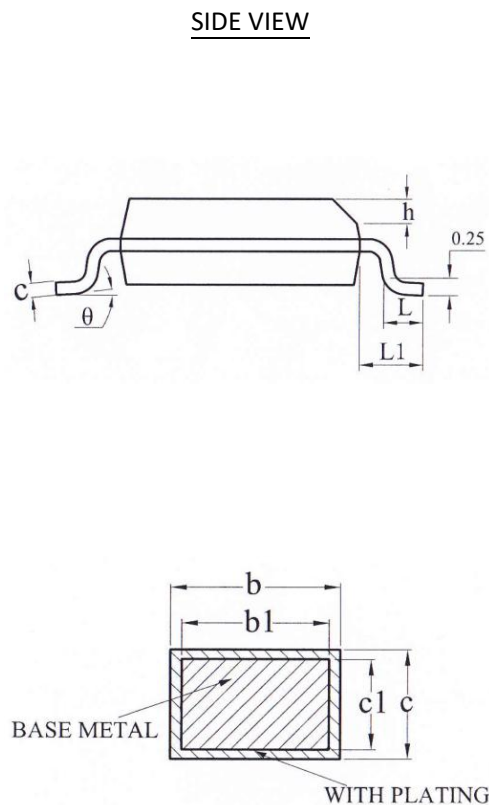
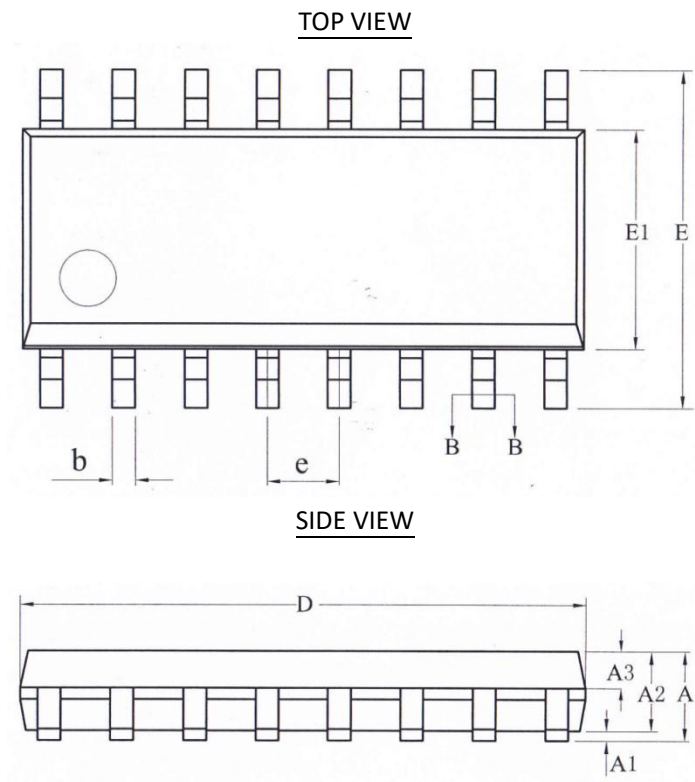


Figure 4. Typical Time-Division Application of the CD4052

PACKAGE OUTLINE DIMENSIONS
SOP16


SYMBOL	MILLIMETER			SYMBOL	MILLIMETER		
	MIN	MIN	MIN		MIN	NOM	MAX
A	-	-	1.75	D	9.80	9.90	10.00
A1	0.10	-	0.225	E	5.80	6.00	6.20
A2	1.30	1.45	1.50	E1	3.80	3.90	4.00
A3	0.60	0.65	0.70	e	1.27 (BSC)		
b	0.39	-	0.47	H	0.25	-	0.50
b1	0.38	0.41	0.44	L	0.50	-	0.80
c	0.20	-	0.24	L1	1.05 (REF)		
c1	0.19	0.20	0.21	θ	0°	-	8°

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