



T-51-11

# CD4529BM/CD4529BC Dual 4-Channel or Single 8-Channel Analog Data Selector

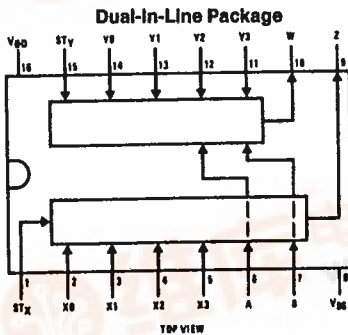
## General Description

The CD4529B is a dual 4-channel or a single 8-channel analog data selector, implemented with complementary MOS (CMOS) circuits constructed with N- and P-channel enhancement mode transistors. Dual 4-channel or 8-channel mode operation is selected by proper input coding, with outputs Z and W tied together for the single 8-bit mode. The device is suitable for digital as well as analog applications, including various 1-of-4 and 1-of-8 data selector functions. Since the device is analog and bidirectional, it can also be used for dual binary to 1-of-4 or single 1-of-8 decoder applications.

## Features

- Wide supply voltage range 3.0V to 15V
- High noise immunity 0.45 V<sub>DD</sub> (typ.)
- Low quiescent power dissipation 0.005 μW/package (typ.)@5.0 V<sub>DC</sub>
- 10 MHz frequency operation (typ.)
- Data paths are bidirectional
- Linear ON resistance [120Ω (typ.)@15V]
- TRI-STATE® outputs (high impedance disable strobe)
- Plug-in replacement for MC14529B

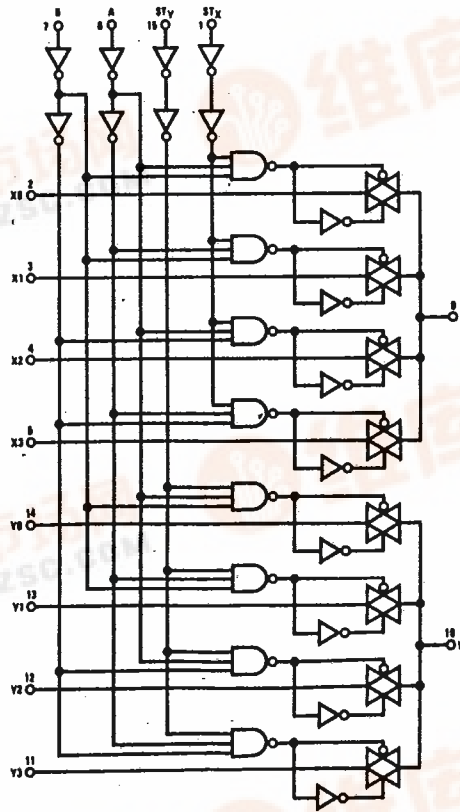
## Connection Diagram



Order Number CD4529B\*

\*Please look into Section 8, Appendix D for availability of various package types.

## Logic Diagram



## Truth Table

ST <sub>X</sub>	ST <sub>Y</sub>	B	A	Z	W
1	1	0	0	X0	Y0
1	1	0	1	X1	Y1
1	1	1	0	X2	Y2
1	1	1	1	X3	Y3
1	0	0	0	X0	
1	0	0	1	X1	
1	0	1	0	X2	
1	0	1	1	X3	
0	1	0	0	Y0	
0	1	0	1	Y1	
0	1	1	0	Y2	
0	1	1	1	Y3	
0	0	X	X	High Impedance (TRI-STATE)	

Dual 4-Channel Mode 2 Outputs

Single 8-Channel Mode 1 Output (Z and W tied together)

X = Don't care

TL/F/5999-1



7-51-11

**Absolute Maximum Ratings** (Notes 1 & 2)

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/Distributors for availability and specifications.

DC Supply Voltage (V <sub>DD</sub> )	-0.5V to +18V
Input Voltage (V <sub>IN</sub> )	-0.5V to V <sub>DD</sub> + 0.5V
Storage Temperature Range (T <sub>S</sub> )	-65°C to +150°C
Power Dissipation (P <sub>D</sub> )	
Dual-In-Line	700 mW
Small Outline	500 mW
Lead Temperature (T <sub>L</sub> )	
(Soldering, 10 seconds)	260°C

**Recommended Operating Conditions** (Note 2)

DC Supply Voltage (V <sub>DD</sub> )	3V to 15V
Input Voltage (V <sub>IN</sub> )	0 to V <sub>DD</sub>
Operating Temperature Range (T <sub>A</sub> )	
CD4529BM	-55°C to +125°C
CD4529BC	-40°C to +85°C

CD4529BM/CD4529BC

**DC Electrical Characteristics** CD4529BM (Note 2)

Symbol	Parameter	Conditions	-55°C		+25°C			+125°C		Units
			Min	Max	Min	Typ	Max	Min	Max	
I <sub>DD</sub>	Quiescent Device Current	V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V		1.0 1.0 2.0		0.001 0.002 0.003	1.0 1.0 2.0		60 60 120	μA μA μA
V <sub>OL</sub>	Low Level Output Voltage	V <sub>IL</sub> = 0V, V <sub>IH</sub> = V <sub>DD</sub> ,  I <sub>O</sub>   < 1 μA V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V		0.05 0.05 0.05		0 0 0	0.05 0.05 0.05		0.05 0.05 0.05	V V V
V <sub>OH</sub>	High Level Output Voltage	V <sub>IL</sub> = 0V, V <sub>IH</sub> = V <sub>DD</sub> ,  I <sub>O</sub>   < 1 μA V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V	4.95 9.95 14.95		4.95 9.95 14.95	5.0 10.0 15.0		4.95 9.95 14.95		V V V
V <sub>IL</sub>	Low Level Input Voltage (Note 3)	V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V		1.5 3.0 4.0		2.25 4.50 6.75	1.5 3.0 4.0		1.5 3.0 4.0	V V V
V <sub>IH</sub>	High Level Input Voltage (Note 3)	V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V	3.5 7.0 11.0		3.5 7.0 11.0	2.75 5.50 8.25		3.5 7.0 11.0		V V V
I <sub>IN</sub>	Input Current	V <sub>DD</sub> = 15V V <sub>IN</sub> = 0V V <sub>IN</sub> = 15V		-0.1 0.1		-10 <sup>-5</sup> 10 <sup>-5</sup>	-0.1 0.1		-1.0 1.0	μA μA
R <sub>ON</sub>	ON Resistance	V <sub>DD</sub> = 5V, V <sub>SS</sub> = -5V V <sub>IN</sub> = 5V V <sub>IN</sub> = -5V V <sub>IN</sub> = ±0.25V V <sub>DD</sub> = 7.5V, V <sub>SS</sub> = -7.5V V <sub>IN</sub> = 7.5V V <sub>IN</sub> = -7.5V V <sub>IN</sub> = ±0.25V V <sub>DD</sub> = 10V, V <sub>SS</sub> = 0V V <sub>IN</sub> = 10V V <sub>IN</sub> = 0.25V V <sub>IN</sub> = 5.6V V <sub>DD</sub> = 15V, V <sub>SS</sub> = 0V V <sub>IN</sub> = 15V V <sub>IN</sub> = 0.25V V <sub>IN</sub> = 9.3V		400 400 400 240 240 240 400 400 400 250 250 250		165 100 155 135 75 100 165 100 160 135 75 110	480 480 480 270 270 270 480 480 480 270 270 270		640 640 640 400 400 400 640 640 640 400 400 400	Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω
I <sub>OFF</sub>	Input to Output Leakage Current	V <sub>SS</sub> = -5V, V <sub>DD</sub> = 5V, V <sub>IN</sub> = 5V, V <sub>OUT</sub> = -5V V <sub>SS</sub> = -5V, V <sub>DD</sub> = 5V, V <sub>IN</sub> = -5V, V <sub>OUT</sub> = 5V V <sub>SS</sub> = -7.5V, V <sub>DD</sub> = 7.5V, V <sub>IN</sub> = 7.5V, V <sub>OUT</sub> = -7.5V V <sub>SS</sub> = -7.5V, V <sub>DD</sub> = 7.5V, V <sub>IN</sub> = -7.5V, V <sub>OUT</sub> = 7.5V		±125		±0.001	±125		±1250	nA nA nA nA

5

CD4529BM/CD4529BC

**DC Electrical Characteristics** CD4529BC (Note 2) (Continued) **T-51-ii**

Symbol	Parameter	Conditions	-40°C		+25°C			+85°C		Units
			Min	Max	Min	Typ	Max	Min	Max	
I <sub>DD</sub>	Quiescent Device Current	V <sub>DD</sub> = 5V		5.0		0.001	5.0		70	μA
		V <sub>DD</sub> = 10V		5.0		0.002	5.0		70	μA
		V <sub>DD</sub> = 15V		10.0		0.003	10.0		140	μA
V <sub>OL</sub>	Low Level Output Voltage	V <sub>IL</sub> = 0V, V <sub>IH</sub> = V <sub>DD</sub> ,  I <sub>O</sub>   < 1 μA								
		V <sub>DD</sub> = 5V		0.05			0.05		0.05	V
		V <sub>DD</sub> = 10V		0.05			0.05		0.05	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>IL</sub> = 0V, V <sub>IH</sub> = V <sub>DD</sub> ,  I <sub>O</sub>   < 1 μA								
		V <sub>DD</sub> = 5V	4.95		4.95	5.00		4.95		V
		V <sub>DD</sub> = 10V	9.95		9.95	10.00		9.95		V
V <sub>IL</sub>	Low Level Input Voltage (Note 3)	V <sub>DD</sub> = 5V, V <sub>OUT</sub> = 4.5 or 0.5 V <sub>DC</sub>		1.5		2.25	1.5		1.5	V
		V <sub>DD</sub> = 10V, V <sub>OUT</sub> = 9.0 or 1.0 V <sub>DC</sub>		3.0		4.50	3.0		3.0	V
		V <sub>DD</sub> = 15V, V <sub>OUT</sub> = 13.5 or 1.5 V <sub>DC</sub>		4.0		6.75	4.0		4.0	V
V <sub>IH</sub>	High Level Input Voltage (Note 3)	V <sub>DD</sub> = 5V, V <sub>OUT</sub> = 0.5 or 4.5 V <sub>DC</sub>	3.5		3.5	2.75		3.5		V
		V <sub>DD</sub> = 10V, V <sub>OUT</sub> = 1.0 or 9.0 V <sub>DC</sub>	7.0		7.0	5.50		7.0		V
		V <sub>DD</sub> = 15V, V <sub>OUT</sub> = 1.5 or 13.5 V <sub>DC</sub>	11.0		11.0	8.25		11.0		V
I <sub>IN</sub>	Input Current	V <sub>DD</sub> = 15V								
		V <sub>IN</sub> = 0V		-0.3		-10 <sup>-5</sup>	-0.3		-1.0	μA
		V <sub>IN</sub> = 15V		0.3		10 <sup>-5</sup>	0.3		1.0	μA
R <sub>ON</sub>	ON Resistance	V <sub>DD</sub> = 5V, V <sub>SS</sub> = -5V								
		V <sub>IN</sub> = 5V		410		165	480		560	Ω
		V <sub>IN</sub> = -5V		410		100	480		560	Ω
		V <sub>IN</sub> = ±0.25V		410		155	480		560	Ω
		V <sub>DD</sub> = 7.5V, V <sub>SS</sub> = -7.5V								
		V <sub>IN</sub> = 7.5V		250		135	270		350	Ω
		V <sub>IN</sub> = -7.5V		250		75	270		350	Ω
		V <sub>IN</sub> = ±0.25V		250		100	270		350	Ω
		V <sub>DD</sub> = 10V, V <sub>SS</sub> = 0V								
		V <sub>IN</sub> = 10V		410		165	480		560	Ω
		V <sub>IN</sub> = 0.25V		410		100	480		560	Ω
		V <sub>IN</sub> = 5.6V		410		160	480		560	Ω
		V <sub>DD</sub> = 15V, V <sub>SS</sub> = 0V								
		V <sub>IN</sub> = 15V		250		135	270		350	Ω
V <sub>IN</sub> = 0.25V		250		75	270		350	Ω		
V <sub>IN</sub> = 9.3V		250		110	270		350	Ω		
I <sub>OFF</sub>	Input-Output Leakage Current	V <sub>SS</sub> = -5V, V <sub>DD</sub> = 5V								
		V <sub>IN</sub> = 5V, V <sub>OUT</sub> = -5V		±125		±0.001	±125		±500	nA
		V <sub>IN</sub> = -5V, V <sub>OUT</sub> = 5V		±125		±0.001	±125		±500	nA
		V <sub>SS</sub> = -7.5V, V <sub>DD</sub> = 7.5V								
		V <sub>IN</sub> = 7.5V, V <sub>OUT</sub> = -7.5V		±250		±0.0015	±250		±1000	nA
V <sub>IN</sub> = -7.5V, V <sub>OUT</sub> = 7.5V		±250		±0.0015	±250		±1000	nA		

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The tables of "Recommended Operating Conditions" and "Electrical Characteristics" provide conditions for actual device operation.

Note 2: V<sub>SS</sub> = 0V unless otherwise specified.

Note 3: Switch OFF is defined as |I<sub>O</sub>| ≤ 10 μA, switch ON as defined by R<sub>ON</sub> specification.

CD4529BM/CD4529BC

**AC Characteristics\*** CD4529BM/CD4539BC

T<sub>A</sub> = 25°C, R<sub>L</sub> = 1 kΩ, t<sub>r</sub> = t<sub>f</sub> = 20 ns, unless otherwise specified.

T-51-11

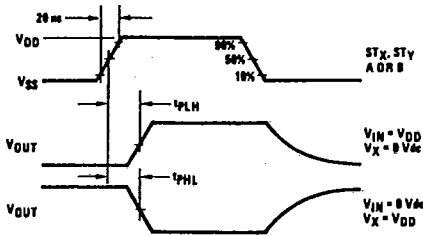
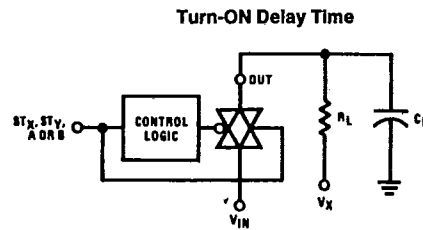
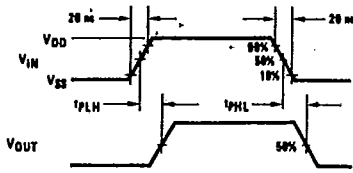
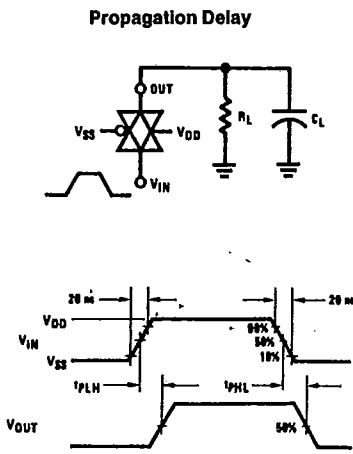
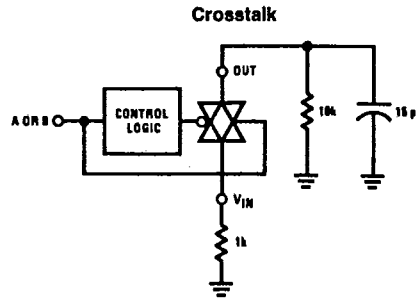
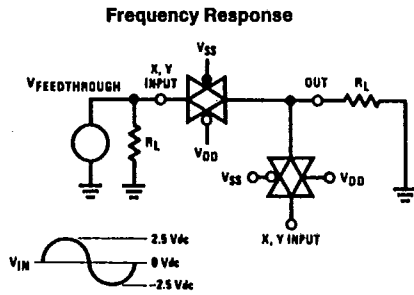
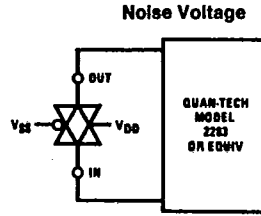
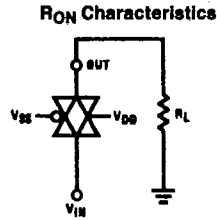
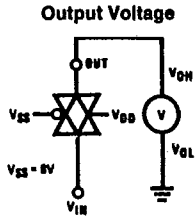
Symbol	Parameter	Conditions	Min	Typ	Max	Units
t <sub>PLH</sub> , t <sub>PHL</sub>	V <sub>IN</sub> to V <sub>OUT</sub> Propagation Delay	V <sub>SS</sub> = 0V, C <sub>L</sub> = 50 pF V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V		20 10 8	40 20 15	ns ns ns
t <sub>PLH</sub> , t <sub>PHL</sub>	Control to Output Propagation Delay	V <sub>IN</sub> = V <sub>DD</sub> or V <sub>SS</sub> , C <sub>L</sub> = 50 pF V <sub>IN</sub> ≤ 10V V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V		200 80 50	400 160 120	ns ns ns
f <sub>MAX</sub>	Maximum Control Input Pulse Frequency	V <sub>SS</sub> = 0V, C <sub>L</sub> = 50 pF V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V		5 10 12		MHz MHz MHz
	Crosstalk, Control to Output	R <sub>OUT</sub> = 10 kΩ, C <sub>L</sub> = 50 pF, V <sub>SS</sub> = 0 V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V		5.0 5.0 5.0		mV mV mV
	Noise Voltage	f = 100 Hz, V <sub>SS</sub> = 0V V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V		24 25 30		nV/√cycle nV/√cycle nV/√cycle
	Sine Wave (Distortion)	f = 100 kHz, V <sub>SS</sub> = 0V V <sub>DD</sub> = 5V V <sub>DD</sub> = 10V V <sub>DD</sub> = 15V V <sub>IN</sub> = 1.77Vrms Centered at 0V, R <sub>L</sub> = 10 kΩ, f = 1 kHz, V <sub>SS</sub> = -5V, V <sub>DD</sub> = 5V		12 12 15 0.36		nV/√cycle nV/√cycle nV/√cycle %
I <sub>LOSS</sub>	Insertion Loss, $I_{LOSS} = 20 \log_{10} \frac{V_{OUT}}{V_{IN}}$	V <sub>IN</sub> = 177Vrms Centered at 0V, V <sub>SS</sub> = -5V, V <sub>DD</sub> = 5V R <sub>L</sub> = 1 kΩ R <sub>L</sub> = 10 kΩ R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 1 MΩ		2.0 0.8 0.25 0.01		dB dB dB dB
BW	Bandwidth, -3dB  Feedthrough and Crosstalk, $20 \log_{10} \frac{V_{OUT}}{V_{IN}} = -50 \text{ db}$	V <sub>IN</sub> = 177Vrms Centered at 0 Vdc, V <sub>SS</sub> = -5V, V <sub>DD</sub> = 5V R <sub>L</sub> = 1 kΩ R <sub>L</sub> = 10 kΩ R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 1 MΩ V <sub>SS</sub> = -5V, V <sub>DD</sub> = 5V R <sub>L</sub> = 1 kΩ R <sub>L</sub> = 10 kΩ R <sub>L</sub> = 100 kΩ R <sub>L</sub> = 1 MΩ		35 28 27 26  850 100 12 1.5		MHz MHz MHz MHz  kHz kHz kHz kHz

\*AC Parameters are guaranteed by DC correlated testing.

CD4529BM/CD4529BC

Test Circuits and Switching Time Waveforms

T-51-11

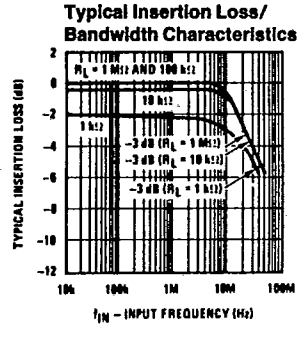
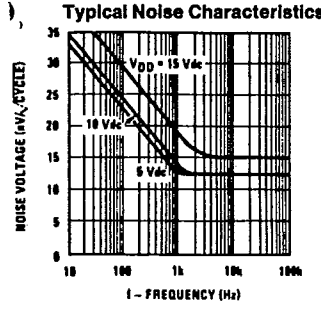
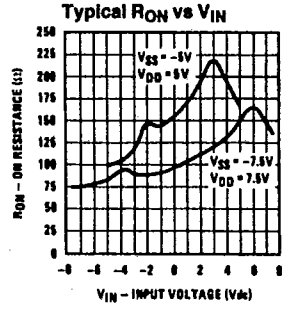


TL/F/5899-2

T-51-11

Typical Performance Characteristics

CD4529BM/CD4529BC



TL/F/5999-3

