



CD4519BM/CD4519BC 4-Bit AND/OR Selector

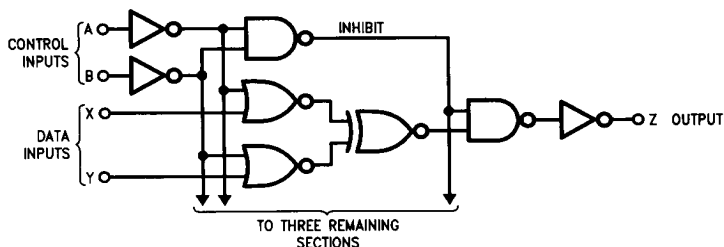
General Description

The CD4519B is a monolithic complementary MOS (CMOS) integrated circuit constructed with N- and P-channel enhancement mode transistors. Depending on the condition of the control inputs, this part provides three functions in one package: a 4-bit AND/OR selector, a quad 2-channel Data Selector, or a Quad Exclusive-NOR Gate. The device outputs have equal source and sink current capabilities and conform to the standard B series output drive and supply voltage ratings.

Features

- Wide supply voltage range 3.0V to 15V
- High noise immunity 0.45 V_{DD} (typ.)
- Low power TTL compatibility fan out of 2 driving 74L or 1 driving 74LS
- 5V–10V–15V parametric ratings
- Symmetrical output characteristics
- Maximum input leakage 1 μ A at 15V over full temperature range
- Second source of Motorola MC14519

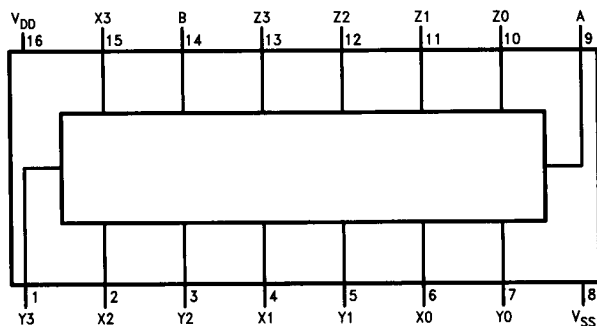
Logic Diagram



TL/F/5996-1

Connection Diagram

Dual-In-Line Package



TL/F/5996-2

Top View

Order Number CD4519B*

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

Truth Table

Control Inputs		Output Z_n
A	B	
0	0	0
0	1	Y_n
1	0	X_n
1	1	$X_n \bullet Y_n$

Note: $X_n \bullet Y_n = \bar{X}_n + \bar{Y}_n = X_n Y_n + \bar{X}_n \bar{Y}_n$

Absolute Maximum Ratings

(Notes 1 and 2)

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

DC Supply Voltage (V_{DD}) $-0.5 V_{DC}$ to $+18 V_{DC}$ Input Voltage (V_{IN}) $-0.5 V_{DC}$ to V_{DD} or $+0.5 V_{DC}$ Storage Temperature Range (T_S) -65°C to $+150^{\circ}\text{C}$ Power Dissipation (P_D)

Dual-In-Line 700 mW

Small Outline 500 mW

Lead Temperature (T_L)(Soldering, 10 sec.) 260°C **Recommended Operating Conditions** (Note 2)DC Supply Voltage (V_{DD}) $+3 V_{DC}$ to $+15 V_{DC}$ Input Voltage (V_{IN}) $0 V_{DC}$ to V_{DD} V_{DC} Operating Temperature Range (T_A) -55°C to $+125^{\circ}\text{C}$

CD4519BM

CD4519BC

 -40°C to $+85^{\circ}\text{C}$ **DC Electrical Characteristics** CD4519BM (Note 2)

Symbol	Parameter	Conditions	-55°C		$+25^{\circ}\text{C}$			$+125^{\circ}\text{C}$		Units
			Min	Max	Min	Typ	Max	Min	Max	
I_{DD}	Quiescent Device Current	$V_{DD} = 5V, V_{IN} = V_{DD}$ or V_{SS}		1		0.005	1	30		μA
		$V_{DD} = 10V, V_{IN} = V_{DD}$ or V_{SS}		2		0.006	2	60		μA
		$V_{DD} = 15V, V_{IN} = V_{DD}$ or V_{SS}		4		0.007	4	120		μA
V_{OL}	Low Level Output Voltage	$ I_O < 1 \mu\text{A}$								
		$V_{DD} = 5V$		0.05		0	0.05		0.05	V
		$V_{DD} = 10V$		0.05		0	0.05		0.05	V
		$V_{DD} = 15V$		0.05		0	0.05		0.05	V
V_{OH}	High Level Output Voltage	$ I_O < 1 \mu\text{A}$								
		$V_{DD} = 5V$	4.95		4.95	5		4.95		V
		$V_{DD} = 10V$	9.95		9.95	10		9.95		V
		$V_{DD} = 15V$	14.95		14.95	15		14.95		V
V_{IL}	Low Level Input Voltage	$ I_O < 1 \mu\text{A}$								
		$V_{DD} = 5V, V_O = 0.5V$ or $4.5V$		1.5		2	1.5	1.5		V
		$V_{DD} = 10V, V_O = 1.0V$ or $9.0V$		3.0		4	3.0	3.0		V
		$V_{DD} = 15V, V_O = 1.5V$ or $13.5V$		4.0		6	4.0	4.0		V
V_{IH}	High Level Input Voltage	$ I_O < 1 \mu\text{A}$								
		$V_{DD} = 5V, V_O = 0.5V$ or $4.5V$	3.5		3.5	3		3.5		V
		$V_{DD} = 10V, V_O = 1.0V$ or $9.0V$	7.0		7.0	6		7.0		V
		$V_{DD} = 15V, V_O = 1.5V$ or $13.5V$	11.0		11.0	9		11.0		V
I_{OL}	Low Level Output Current (Note 3)	$V_{DD} = 5V, V_O = 0.4V$	0.64		0.51	0.88		0.36		mA
		$V_{DD} = 10V, V_O = 0.5V$	1.6		1.3	2.25		0.9		mA
		$V_{DD} = 15V, V_O = 1.5V$	4.2		3.4	8.8		2.4		mA
I_{OH}	High Level Output Current (Note 3)	$V_{DD} = 5V, V_O = 4.6V$	-0.64		-0.51	-0.88		-0.36		mA
		$V_{DD} = 10V, V_O = 9.5V$	-1.6		-1.3	-2.25		-0.9		mA
		$V_{DD} = 15V, V_O = 13.5V$	-4.2		-3.4	-8.8		-2.4		mA
I_{IN}	Input Current	$V_{DD} = 15V, V_{IN} = 0V$		-0.1		-10^{-5}	-0.1	-1.0		μA
		$V_{DD} = 15V, V_{IN} = 15V$		0.1		10^{-5}	0.1	1.0		μA

DC Electrical Characteristics CD4519BC (Note 2)

Symbol	Parameter	Conditions	-40°C		$+25^{\circ}\text{C}$			$+85^{\circ}\text{C}$		Units
			Min	Max	Min	Typ	Max	Min	Max	
I_{DD}	Quiescent Device Current	$V_{DD} = 5V, V_{IN} = V_{DD}$ or V_{SS}		4			4	30		μA
		$V_{DD} = 10V, V_{IN} = V_{DD}$ or V_{SS}		8			8	60		μA
		$V_{DD} = 15V, V_{IN} = V_{DD}$ or V_{SS}		16			16	120		μA
V_{OL}	Low Level Output Voltage	$ I_O < 1 \mu\text{A}$								
		$V_{DD} = 5V$		0.05		0	0.05		0.05	V
		$V_{DD} = 10V$		0.05		0	0.05		0.05	V
		$V_{DD} = 15V$		0.05		0	0.05		0.05	V
V_{OH}	High Level Output Voltage	$ I_O < 1 \mu\text{A}$								
		$V_{DD} = 5V$	4.95		4.95	5		4.95		V
		$V_{DD} = 10V$	9.95		9.95	10		9.95		V
		$V_{DD} = 15V$	14.95		14.95	15		14.95		V

DC Electrical Characteristics CD4519BC (Note 2) (Continued)

Symbol	Parameter	Conditions	-40°C		+25°C			+85°C		Units
			Min	Max	Min	Typ	Max	Min	Max	
V_{IL}	Low Level Input Voltage	$ I_{OL} < 1 \mu A$ $V_{DD} = 5V, V_O = 0.5V \text{ or } 4.5V$ $V_{DD} = 10V, V_O = 1.0V \text{ or } 9.0V$ $V_{DD} = 15V, V_O = 1.5V \text{ or } 13.5V$		1.5 3.0 4.0		2 4 6	1.5 3.0 4.0		1.5 3.0 4.0	V V V
V_{IH}	High Level Input Voltage	$ I_{OL} < 1 \mu A$ $V_{DD} = 5V, V_O = 0.5V \text{ or } 4.5V$ $V_{DD} = 10V, V_O = 1.0V \text{ or } 9.0V$ $V_{DD} = 15V, V_O = 1.5V \text{ or } 13.5V$	3.5 7.0 11.0		3.5 7.0 11.0	3 6 9		3.5 7.0 11.0		V V V
I_{OL}	Low Level Output Current (Note 3)	$V_{DD} = 5V, V_O = 0.4V$ $V_{DD} = 10V, V_O = 0.5V$ $V_{DD} = 15V, V_O = 1.5V$	0.52 1.3 3.6		0.44 1.1 3.0	0.88 2.25 8.8		0.36 0.9 2.4		mA mA mA
I_{OH}	High Level Output Current (Note 3)	$V_{DD} = 5V, V_O = 4.6V$ $V_{DD} = 10V, V_O = 9.5V$ $V_{DD} = 15V, V_O = 13.5V$	-0.52 -1.3 -3.6		-0.44 -1.1 -3.0	-0.88 -2.25 -8.8		-0.36 -0.9 -2.4		mA mA mA
I_{IN}	Input Current	$V_{DD} = 15V, V_{IN} = 0V$ $V_{DD} = 15V, V_{IN} = 15V$		-0.3 0.3		-10^{-5} 10^{-5}	-0.3 0.3		-1.0 1.0	μA μA

AC Electrical Characteristics*

$T_A = 25^\circ C$, $C_L = 50 \text{ pF}$, $R_L = 200 \text{ k}\Omega$, $t_r = t_f = 20 \text{ ns}$, unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PHL}, t_{PLH}	Propagation Delay High-to-Low Level or Low-to-High Level	(Figure 1) $V_{DD} = 5V$ $V_{DD} = 10V$ $V_{DD} = 15V$		180 75 60	360 150 120	ns ns ns
t_{THL}, t_{TLH}	Transition Time	(Figure 1) $V_{DD} = 5V$ $V_{DD} = 10V$ $V_{DD} = 15V$		90 50 40	200 100 80	ns ns ns
C_{IN}	Average Input Capacitance	Any Input (Note 4)		5	7.5	pF
C_{pd}	Power Dissipation Capacity	Any Gate (Note 5)		25		pF

*AC Parameters are guaranteed by DC correlated testing.

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

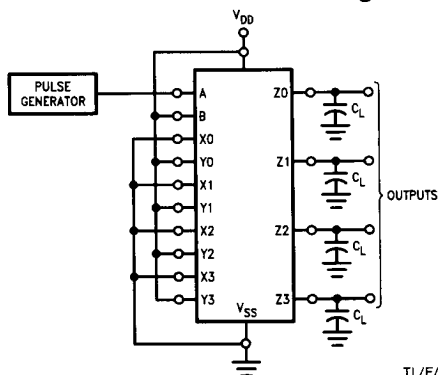
Note 2: $V_{SS} = 0V$ unless otherwise specified.

Note 3: I_{OH} and I_{OL} are tested one output at a time.

Note 4: Capacitance is guaranteed by periodic testing.

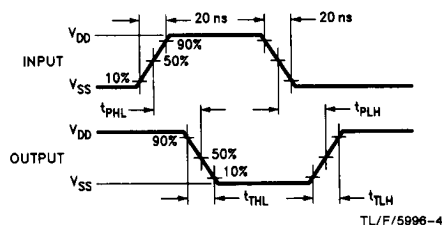
Note 5: C_{pd} determines the no load ac power consumption of any CMOS device. For complete explanation, see 54C/74C Family characteristics application note AN-90.

AC Test Circuit and Switching Time Waveforms



TL/F/5996-3

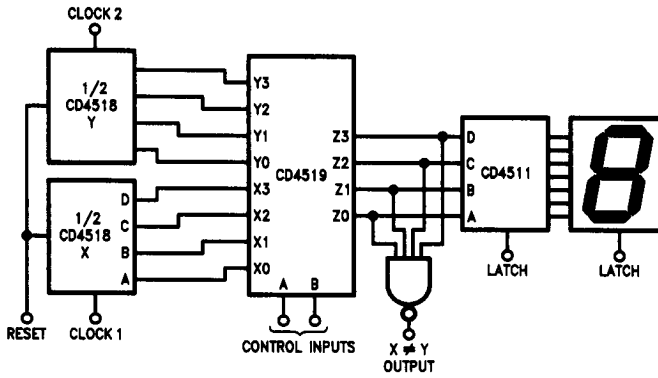
FIGURE 1



TL/F/5996-4

Typical Application

Data Routing and Processing Using the CD4519



Control Inputs		Function
A	B	
0	0	Display Zero
0	1	Display Counter Y
1	0	Display Counter X
1	1	Compare Counters

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