



CD4019BM/CD4019BC Quad AND-OR Select Gate

General Description

The CD4019BM/CD4019BC is a complementary MOS quad AND-OR select gate. Low power and high noise margin over a wide voltage range is possible through implementation of N and P-channel enhancement mode transistors. These complementary MOS (CMOS) transistors provide the building blocks for the 4 "AND-OR select" gate configurations, each consisting of two 2-input AND gates driving a single 2-input OR gate. Selection is accomplished by control bits K_A and K_B . All inputs are protected against static discharge damage.

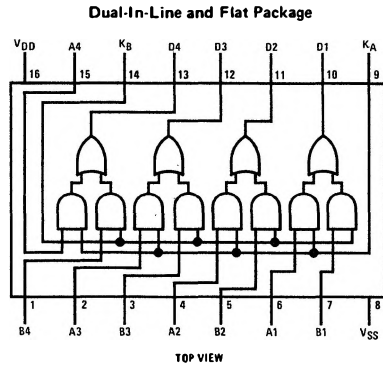
Features

- Wide supply voltage range 3V to 15V
- High noise immunity 0.45 V_{DD} (typ.)
- Low power TTL compatibility fan out of 2
driving 74L
or 1 driving 74LS

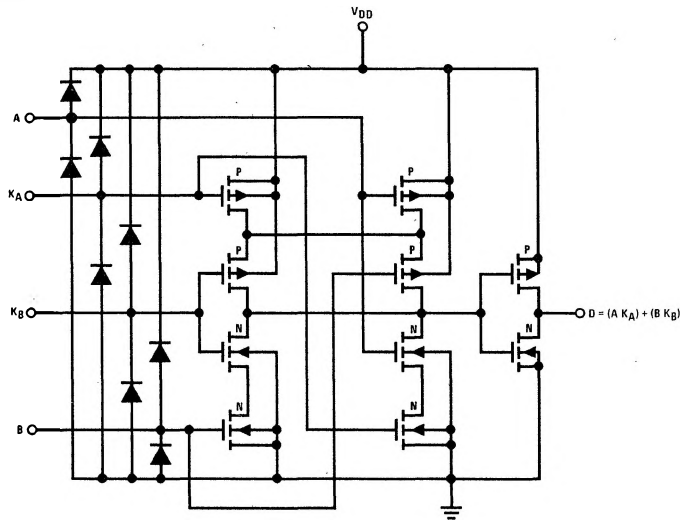
Applications

- AND-OR select gating
- Shift-right/shift-left registers
- True/complement selection
- AND/OR/EXCLUSIVE-OR selection

Connection Diagram



Schematic Diagram



Schematic diagram for 1 of 4 identical stages

Absolute Maximum Ratings

(Notes 1 and 2)

V _{DD} Supply Voltage	-0.5 to +18V
V _{IN} Input Voltage	-0.5 to V _{DD} + 0.5V
T _S Storage Temperature Range	-65°C to +150°C
P _D Package Dissipation	500 mW
T _L Lead Temperature (Soldering, 10 seconds)	300°C

Recommended Operating Conditions

(Note 2)

V _{DD} Supply Voltage	3 to 15V
V _{IN} Input Voltage	0 to V _{DD} V
T _A Operating Temperature Range	-55°C to +125°C
CD4019BM	-55°C to +125°C
CD4019BC	-40°C to +85°C

DC Electrical Characteristics CD4019BM (Note 2)

PARAMETER	CONDITIONS	-55°C		25°C			125°C		UNITS
		MIN	MAX	MIN	TYP	MAX	MIN	MAX	
I _{DD} Quiescent Device Current	V _{DD} = 5V		0.25		0.03	0.25		7.5	μA
	V _{DD} = 10V		0.5		0.05	0.5		15	μA
	V _{DD} = 15V		1.0		0.07	1.0		30	μA
V _{OL} Low Level Output Voltage	I _O < 1 μA								
	V _{DD} = 5V		0.05		0	0.05		0.05	V
	V _{DD} = 10V		0.05		0	0.05		0.05	V
V _{OH} High Level Output Voltage	I _O < 1 μA								
	V _{DD} = 5V	4.95		4.95	5		4.95		V
	V _{DD} = 10V	9.95		9.95	10		9.95		V
V _{IL} Low Level Input Voltage	V _{DD} = 5V, V _O = 0.5V or 4.5V		1.5		2	1.5		1.5	V
	V _{DD} = 10V, V _O = 1V or 9V		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	V _{DD} = 5V, V _O = 0.5V or 4.5V	3.5		3.5	3		3.5		V
	V _{DD} = 10V, V _O = 1V or 9V	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	V _{DD} = 5V, V _O = 0.4V	0.64		0.51	1		0.36		mA
	V _{DD} = 10V, V _O = 0.5V	1.6		1.3	2.5		0.9		mA
	V _{DD} = 15V, V _O = 1.5V	4.2		3.4	10		2.4		mA
I _{OH} High Level Output Current	V _{DD} = 5V, V _O = 4.6V	-0.25		-0.2	-0.4		-0.14		mA
	V _{DD} = 10V, V _O = 9.5V	-0.62		-0.5	-1.0		-0.35		mA
	V _{DD} = 15V, V _O = 13.5V	-1.8		-1.5	-3.0		-1.1		mA
I _{IN} Input Current	V _{DD} = 15V, V _{IN} = 0V		-0.10		-10 ⁻⁵	-0.10		-1.0	μA
	V _{DD} = 15V, V _{IN} = 15V		0.10		10 ⁻⁵	0.10		1.0	μA

DC Electrical Characteristics CD4019BC (Note 2)

PARAMETER	CONDITIONS	-40°C		25°C			85°C		UNITS
		MIN	MAX	MIN	TYP	MAX	MIN	MAX	
I _{DD} Quiescent Device Current	V _{DD} = 5V		1		0.03	1		7.5	μA
	V _{DD} = 10V		2		0.05	2		15	μA
	V _{DD} = 15V		4		0.07	4		30	μA
V _{OL} Low Level Output Voltage	I _O < 1 μA								
	V _{DD} = 5V		0.05		0	0.05		0.05	V
	V _{DD} = 10V		0.05		0	0.05		0.05	V
V _{OH} High Level Output Voltage	I _O < 1 μA								
	V _{DD} = 5V	4.95		4.95	5		4.95		V
	V _{DD} = 10V	9.95		9.95	10		9.95		V
V _{IL} Low Level Input Voltage	V _{DD} = 5V, V _O = 0.5V or 4.5V		1.5		2	1.5		1.5	V
	V _{DD} = 10V, V _O = 1V or 9V		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	V _{DD} = 5V, V _O = 0.5V or 4.5V	3.5		3.5	3		3.5		V
	V _{DD} = 10V, V _O = 1V or 9V	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	V _{DD} = 5V, V _O = 0.4V	0.52		0.44	1		0.36		mA
	V _{DD} = 10V, V _O = 0.5V	1.3		1.1	2.5		0.9		mA
	V _{DD} = 15V, V _O = 1.5V	3.6		3.0	10		2.4		mA
I _{OH} High Level Output Current	V _{DD} = 5V, V _O = 4.6V	-0.2		-0.16	-0.4		-0.12		mA
	V _{DD} = 10V, V _O = 9.5V	-0.5		-0.4	-1.0		-0.3		mA
	V _{DD} = 15V, V _O = 13.5V	-1.4		-1.2	-3.0		-1.0		mA
I _{IN} Input Current	V _{DD} = 15V, V _{IN} = 0V		-0.30		-10 ⁻⁵	-0.30		-1.0	μA
	V _{DD} = 15V, V _{IN} = 15V		0.30		10 ⁻⁵	0.30		1.0	μA

AC Electrical Characteristics T_A = 25°C, C_L = 50 pF, R_L = 200 k, unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
t _{PHL} , t _{PLH} Propagation Delay Input to Output	V _{DD} = 5V		100	300	ns
	V _{DD} = 10V		50	120	ns
	V _{DD} = 15V		45	100	ns
t _{THL} High-to-Low Level Transition Time	V _{DD} = 5V		100	200	ns
	V _{DD} = 10V		50	100	ns
	V _{DD} = 15V		40	80	ns
t _{TLH} Low-to-High Level Transition Time	V _{DD} = 5V		150	300	ns
	V _{DD} = 10V		70	140	ns
	V _{DD} = 15V		50	100	ns
C _{IN} Input Capacitance	All A and B Inputs		5	7.5	pF
	K _A and K _B Inputs, (Note 3)		10	15	pF

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: Capacitance is guaranteed by periodic testing.