

## CD4019BC Quad AND-OR Select Gate

### General Description

The 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: 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

### Applications

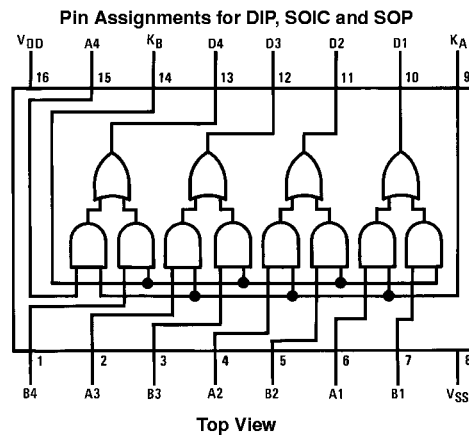
- AND-OR select gating
- Shift-right/shift-left registers
- True/complement selection
- AND/OR/EXCLUSIVE-OR selection

### Ordering Code:

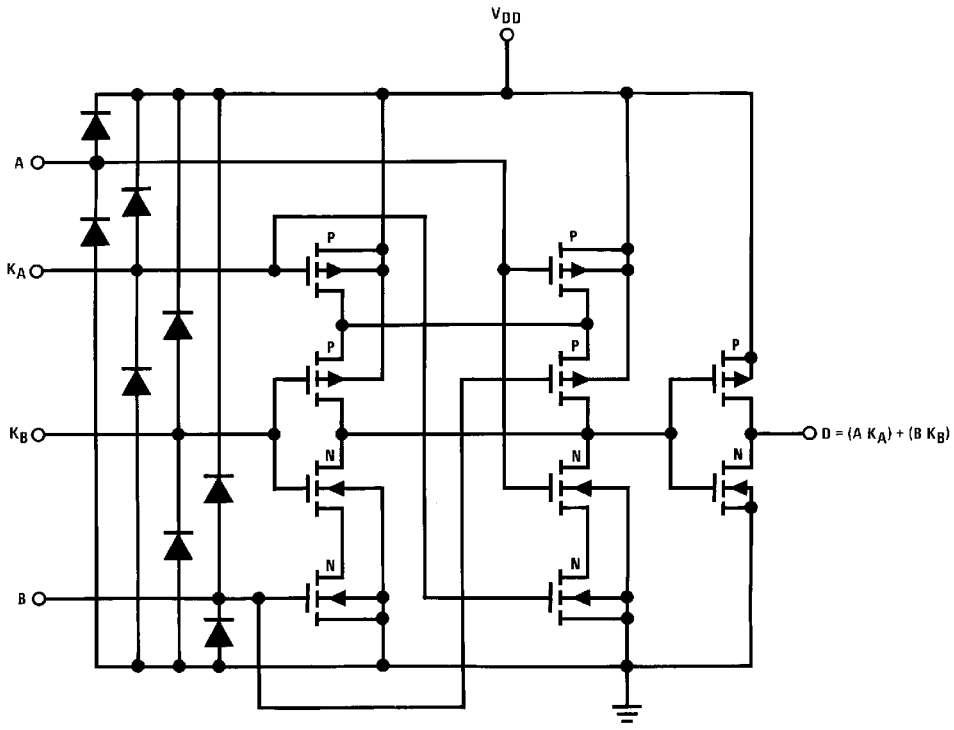
Order Number	Package Number	Package Description
CD4019BCM	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
CD4019BCSJ	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
CD4019BCN	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

### Connection Diagram



### Schematic Diagram



Schematic diagram for 1 of 4 identical stages

### Absolute Maximum Ratings (Note 1)

(Note 2)

Supply Voltage ( $V_{DD}$ )	-0.5V to +18V
Input Voltage ( $V_{IN}$ )	-0.5V to $V_{DD} + 0.5V$
Storage Temperature Range ( $T_S$ )	-65°C to +150°C
Power Dissipation ( $P_D$ )	
Dual-In-Line	700 mW
Small Outline	500 mW
Lead Temperature ( $T_L$ )	
(Soldering, 10 seconds)	260°C

### Recommended Operation

(Note 2)

DC Supply Voltage ( $V_{DD}$ )	+3V to +15V
Input Voltage ( $V_{IN}$ )	0V to $V_{DD}V$
Operating Temperature Range ( $T_A$ )	-40°C to +85°C

**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 tables of "Recommended Operating Conditions" and "Electrical Characteristics" provide conditions for actual device operation.

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

### DC Electrical Characteristics (Note 3)

Symbol	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	$\mu A$
		$V_{DD} = 10V$		2		0.05	2		15	$\mu A$
		$V_{DD} = 15V$		4		0.07	4		30	$\mu A$
$V_{OL}$	LOW Level Output Voltage	$ I_O  < 1 \mu 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 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	$V_{DD} = 5V, V_O = 0.5V$ 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	$V_{DD} = 5V, V_O = 0.5V$ 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 4)	$V_{DD} = 5V, V_O = 0.4V$	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 (Note 4)	$V_{DD} = 5V, V_O = 4.6V$	-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	$\mu A$
		$V_{DD} = 15V, V_{IN} = 15V$		0.30		$10^{-5}$	0.30		1.0	$\mu A$

**Note 3:**  $V_{SS} = 0V$  unless otherwise specified.

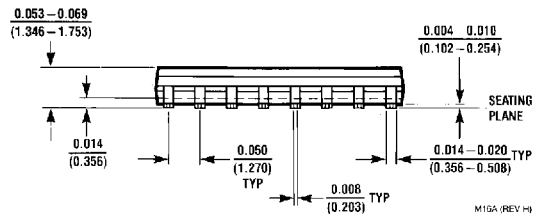
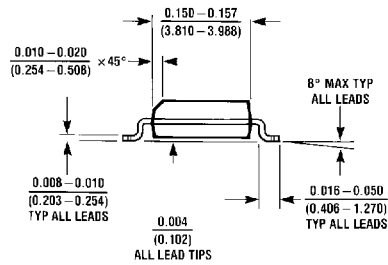
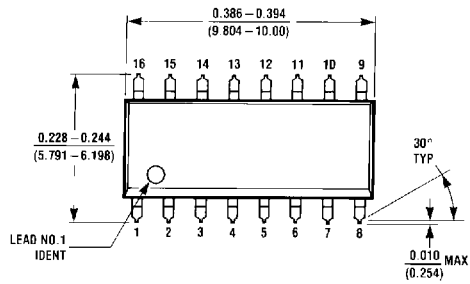
**Note 4:**  $I_{OH}$  and  $I_{OL}$  are tested one output at a time.

**AC Electrical Characteristics** (Note 5) $T_A = 25^\circ\text{C}$ ,  $C_L = 50\text{ pF}$ ,  $R_L = 200\text{ k}$ , unless otherwise specified

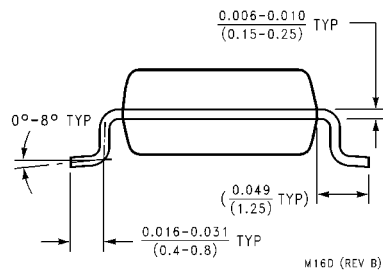
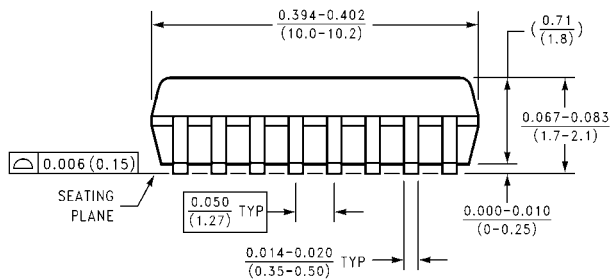
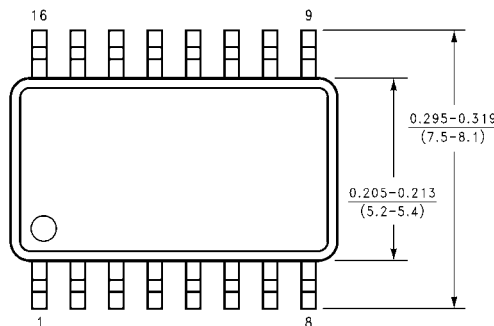
Symbol	Parameter	Conditions	Min	Typ	Max	Units
$t_{PHL}$	Propagation Delay, Input to Output	$V_{DD} = 5\text{V}$		100	300	ns
$t_{PLH}$		$V_{DD} = 10\text{V}$		50	120	ns
		$V_{DD} = 15\text{V}$		45	100	ns
$t_{THL}$	HIGH-to-LOW Level Transition Time	$V_{DD} = 5\text{V}$		100	200	ns
		$V_{DD} = 10\text{V}$		50	100	ns
		$V_{DD} = 15\text{V}$		40	80	ns
$t_{TLH}$	LOW-to-HIGH Level Transition Time	$V_{DD} = 5\text{V}$		150	300	ns
		$V_{DD} = 10\text{V}$		70	140	ns
		$V_{DD} = 15\text{V}$		50	100	ns
$C_{IN}$	Input Capacitance	All A and B Inputs		5	7.5	pF
		$K_A$ and $K_B$ Inputs		10	15	pF

**Note 5:** AC Parameters are guaranteed by DC correlated testing.

**Physical Dimensions** inches (millimeters) unless otherwise noted

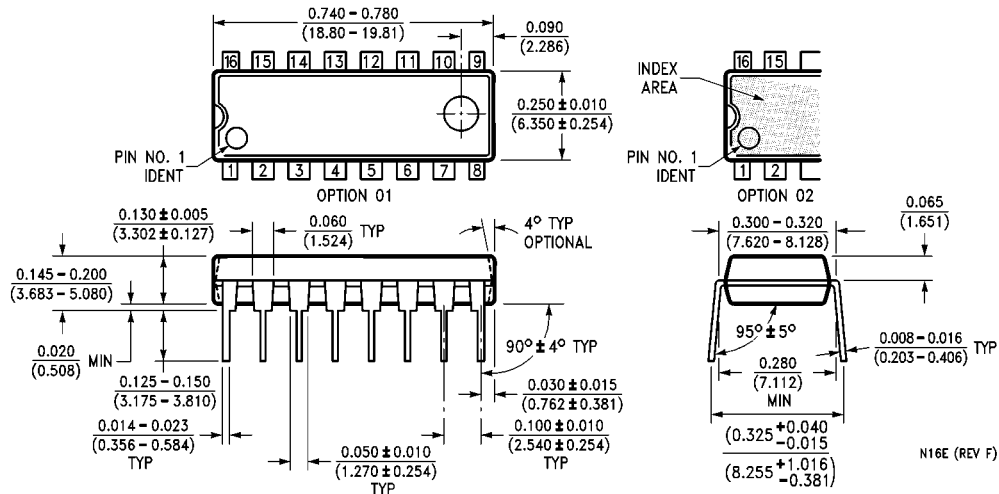


**16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow  
Package Number M16A**



**16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide  
Package Number M16D**

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



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