

## 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

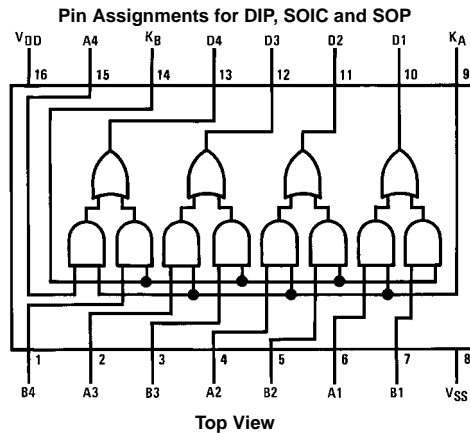
- AND-OR select gating
- Shift-right/shift-left registers
- True/complement selection
- AND/OR/EXCLUSIVE-OR selection

### Ordering Code:

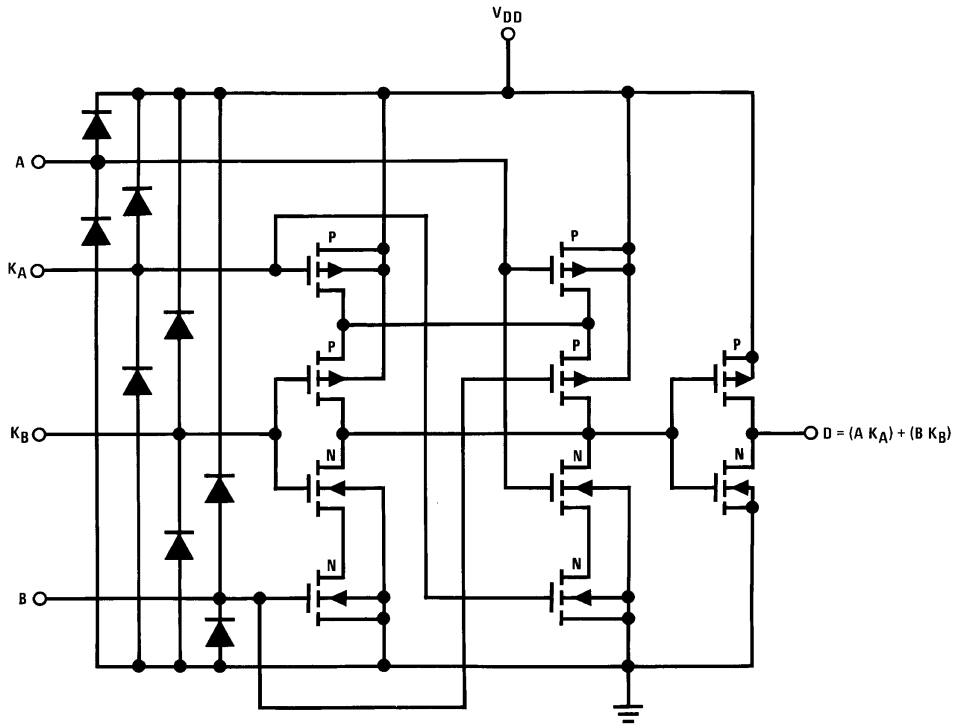
Order Number	Package Number	Package Description
CD4019BCM	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
CD4019BCSJ	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
CD4019BCN	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

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

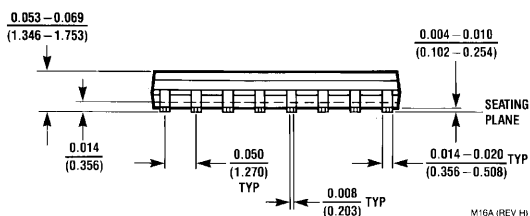
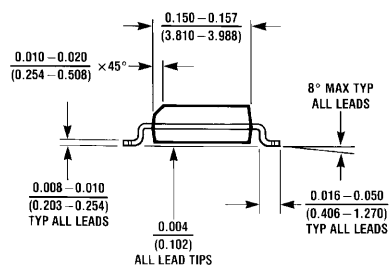
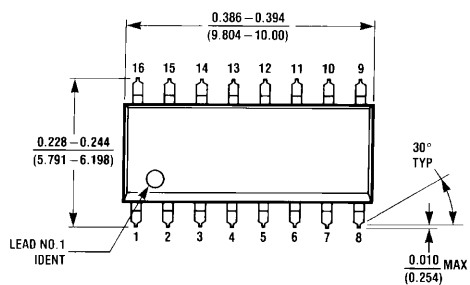
Absolute Maximum Ratings <sup>(Note 1)</sup>			Recommended Operation Conditions <sup>(Note 2)</sup>							
<sup>(Note 2)</sup>										
Supply Voltage ( $V_{DD}$ )		-0.5V to +18V	DC Supply Voltage ( $V_{DD}$ )		+3V to +15V					
Input Voltage ( $V_{IN}$ )		-0.5V to $V_{DD} + 0.5V$	Input Voltage ( $V_{IN}$ )		0V to $V_{DD}V$					
Storage Temperature Range ( $T_S$ )		-65°C to +150°C	Operating Temperature Range ( $T_A$ )		-40°C to +85°C					
Power Dissipation ( $P_D$ )			<b>Note 1:</b> "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.							
Dual-In-Line		700 mW	<b>Note 2:</b> $V_{SS} = 0V$ unless otherwise specified.							
Small Outline		500 mW								
Lead Temperature ( $T_L$ )										
(Soldering, 10 seconds)		260°C								
DC Electrical Characteristics <sup>(Note 3)</sup>										
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_{OL}  < 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_{OL}  < 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	$\mu A$
<b>Note 3:</b> $V_{SS} = 0V$ unless otherwise specified.										
<b>Note 4:</b> $I_{OH}$ 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

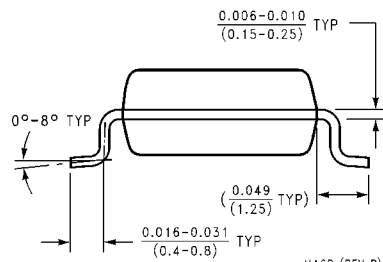
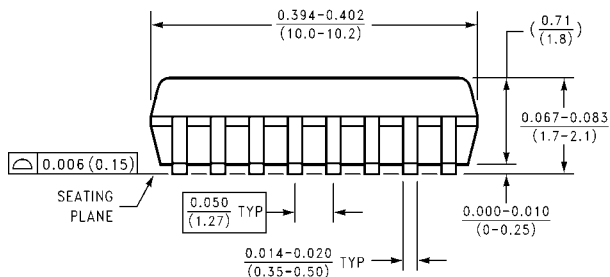
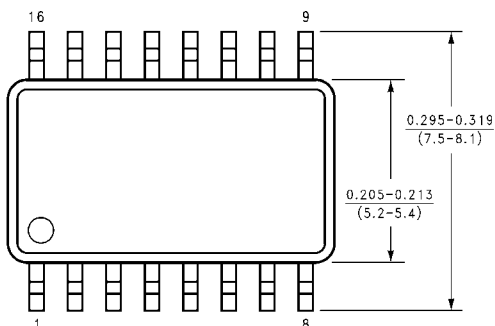
Symbol	Parameter	Conditions	Min	Typ	Max	Units
$t_{PHL}$	Propagation Delay, Input to Output	$V_{DD} = 5\text{V}$		100	300	ns
$t_{PLH}$		$V_{DD} = 10\text{V}$		50	120	ns
		$V_{DD} = 15\text{V}$		45	100	ns
$t_{THL}$	HIGH-to-LOW Level Transition Time	$V_{DD} = 5\text{V}$		100	200	ns
		$V_{DD} = 10\text{V}$		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

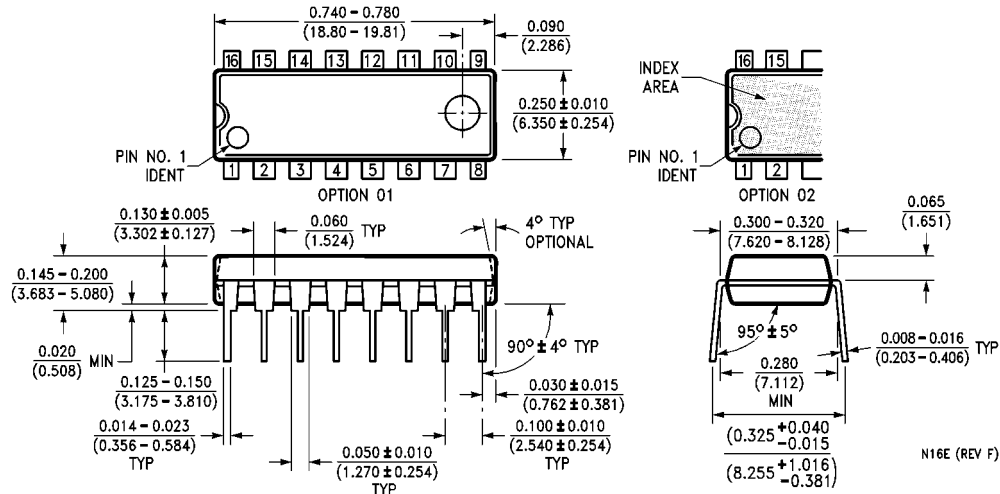


**16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Package Number M16A**



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

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



**16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide  
Package Number N16E**

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