

Quad 2-input NOR gate

General description

The CD4001BM is a quad 2-input NOR gate. This is a monolithic complementary MOS (CMOS) integrated circuit constructed with N- and P-channel enhancement mode transistors.

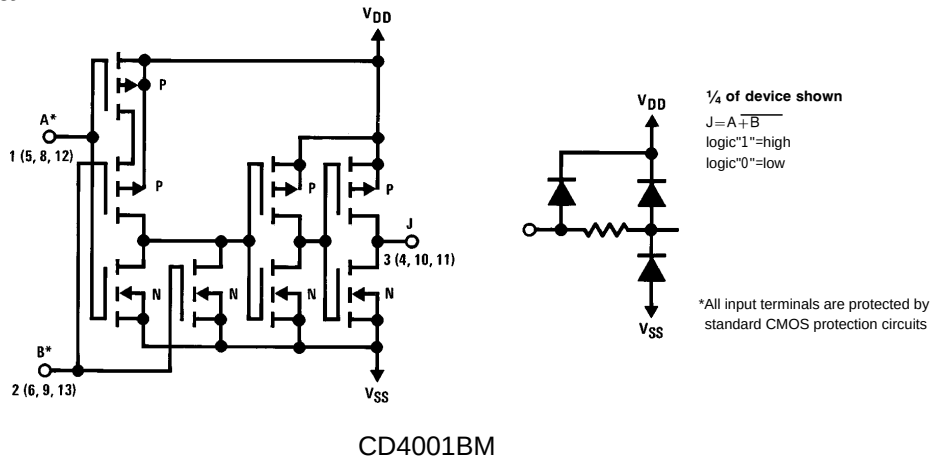
They have symmetrical source and sink current drive capability and conform to the B series output driver standard. These drivers can also buffer the output to provide higher gain and improve conversion performance.

Diodes are placed between VDD and VSS to protect all inputs from quiescent currents.

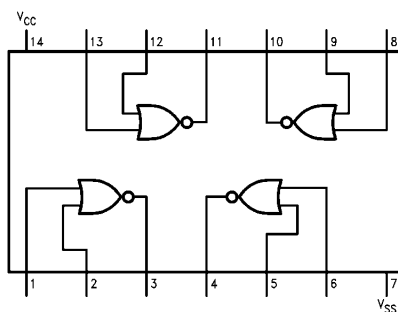
Features and benefits

- Low power TTL compatibility: fan out 2 driver 74L or 1 driver 74LS
- 5 V, 10 V, and 15 V parametric ratings
- Standardized symmetrical output characteristics
- When exceeding 15V across the entire temperature range, the maximum input leakage current is 1mA

Diagram



Diagram



Top View

CD4001BM

Absolute Maximum Ratings

Input Voltage.....	- 0.5V to $V_{DD} + 0.5V$
V_{DD}	- 0.5V _{DC} to +18 V _{DC}
Power Dissipation(PD):	
CD4001BM.....	700mW
Storage Temperature(Ts).....	- 65°C to +150°C Lead Temp
Soldering Temperature (TL):	
(soldering, 10秒).....	+ 260°C

Recommended Operating Conditions

The scope of work(V_{DD}).....	3V _{DC} to 15V _{DC}
Ambient temperature :	
CD4001BM.....	-55°C to + 125°C

DC Electrical Characteristics

Symbol	Parameter	Condition	- 55°C		+ 25°C			+ 125°C		Unit
			Min	Max	Min	Typ	Max	Min	Max	
I_{DD}	supply current	$V_{DD} = 5V, V_{IN} = V_{DD} \text{ or } V_{SS}$		0.25		0.004	0.25		7.5	μA
		$V_{DD} = 10V, V_{IN} = V_{DD} \text{ or } V_{SS}$		0.50		0.005	0.50		15	μA
		$V_{DD} = 15V, V_{IN} = V_{DD} \text{ or } V_{SS}$		1.0		0.006	1.0		30	μA
V_{OL}	LOW-level output voltage	$V_{DD} = 5V$		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	$V_{DD} = 5V$	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	$V_{DD} = 5V, V_O = 4.5V$		1.5		2	1.5		1.5	V
		$V_{DD} = 10V, V_O = 9.0V$		3.0		4	3.0		3.0	V
		$V_{DD} = 15V, V_O = 13.5V$		4.0		6	4.0		4.0	V
V_{IH}	HIGH-level input voltage	$V_{DD} = 5V, V_O = 0.5V$	3.5		3.5	3		3.5		V
		$V_{DD} = 10V, V_O = 1.0V$	7.0		7.0	6		7.0		V
		$V_{DD} = 15V, V_O = 1.5V$	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	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	$V_{DD} = 5V, V_O = 4.6V$	-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	$V_{DD} = 15V, V_{IN} = 0V$		-0.10		-10^{-5}	-0.10		-1.0	μA
		$V_{DD} = 15V, V_{IN} = 15V$		0.10		10^{-5}	0.10		1.0	μA

AC Electrical Characteristics*

$T_A = 25^\circ C$, Input t_r ; $t_f = 20$ ns. $C_L = 50$ pF, $R_L = 200k$. Typical temperature coefficients are 0.3%/°C.

Symbol	Parameter	Condition	Typical	Max	Unit
t_{PHL}	HIGH to LOW propagation delay	$V_{DD} = 5V$	120	250	ns
		$V_{DD} = 10V$	50	100	ns
		$V_{DD} = 15V$	35	70	ns
t_{PLH}	LOW to HIGH propagation delay	$V_{DD} = 5V$	110	250	ns
		$V_{DD} = 10V$	50	100	ns
		$V_{DD} = 15V$	35	70	ns
t_{THL}, t_{TLH}	Transition time	$V_{DD} = 5V$	90	200	ns
		$V_{DD} = 10V$	50	100	ns
		$V_{DD} = 15V$	40	80	ns
C_{IN}	Average input capacitance	Any Input	5	7.5	pF
C_{PD}	Power Dissipation Capacity	Any Gate	14		pF

*AC parameters are guaranteed by DC related tests.

Note1: "Limits" are values that cannot be guaranteed to keep the device safe. They do not imply that the device should be operated at these limits, apart from "Operating Temperature Range". The "Electrical Characteristics" table provides the conditions for the actual operation of the device.

Note2: All voltages are measured with respect to V_{SS} unless otherwise specified.

Note3: I_{OL} 和 I_{OH} Only test one output at a time.

Typical Performance Characteristics

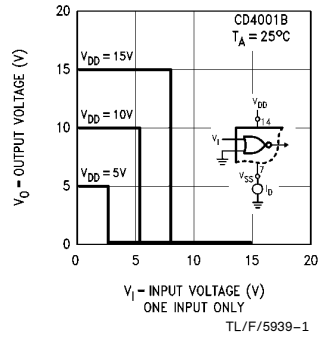


FIGURE 1

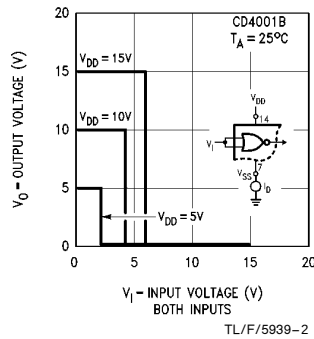


FIGURE 2

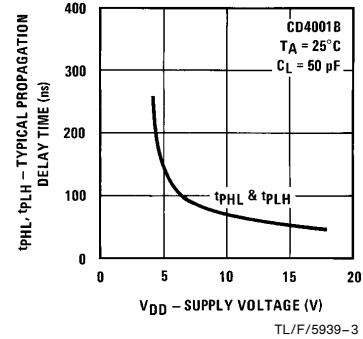


FIGURE 3

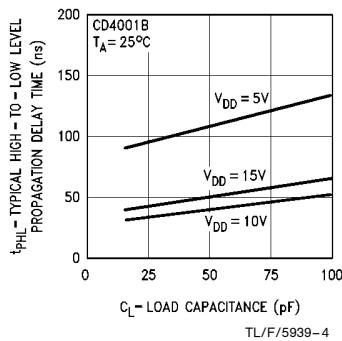


FIGURE 4

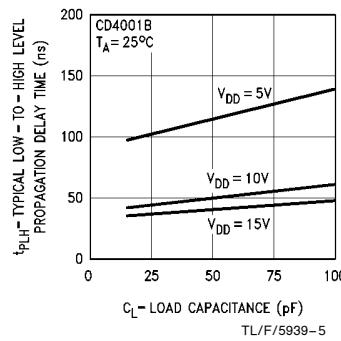


FIGURE 5

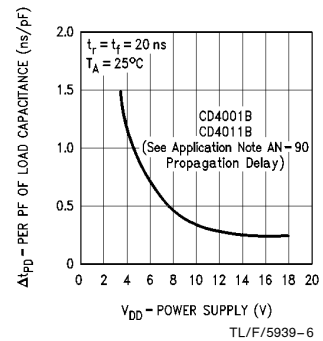


FIGURE 6

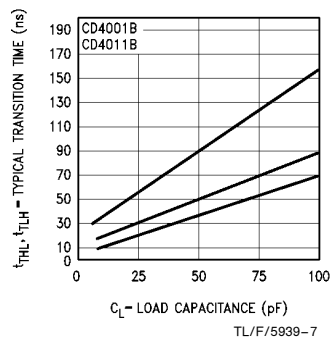


FIGURE 7

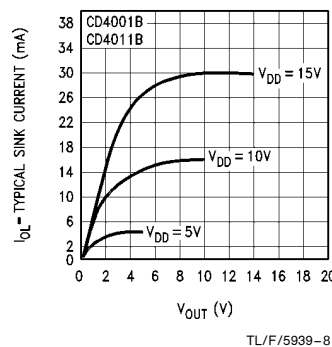


FIGURE 8

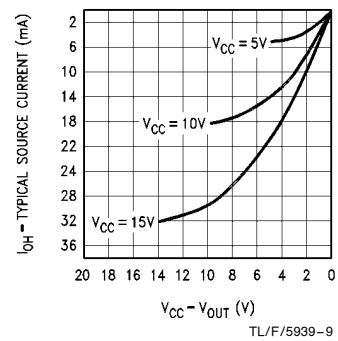
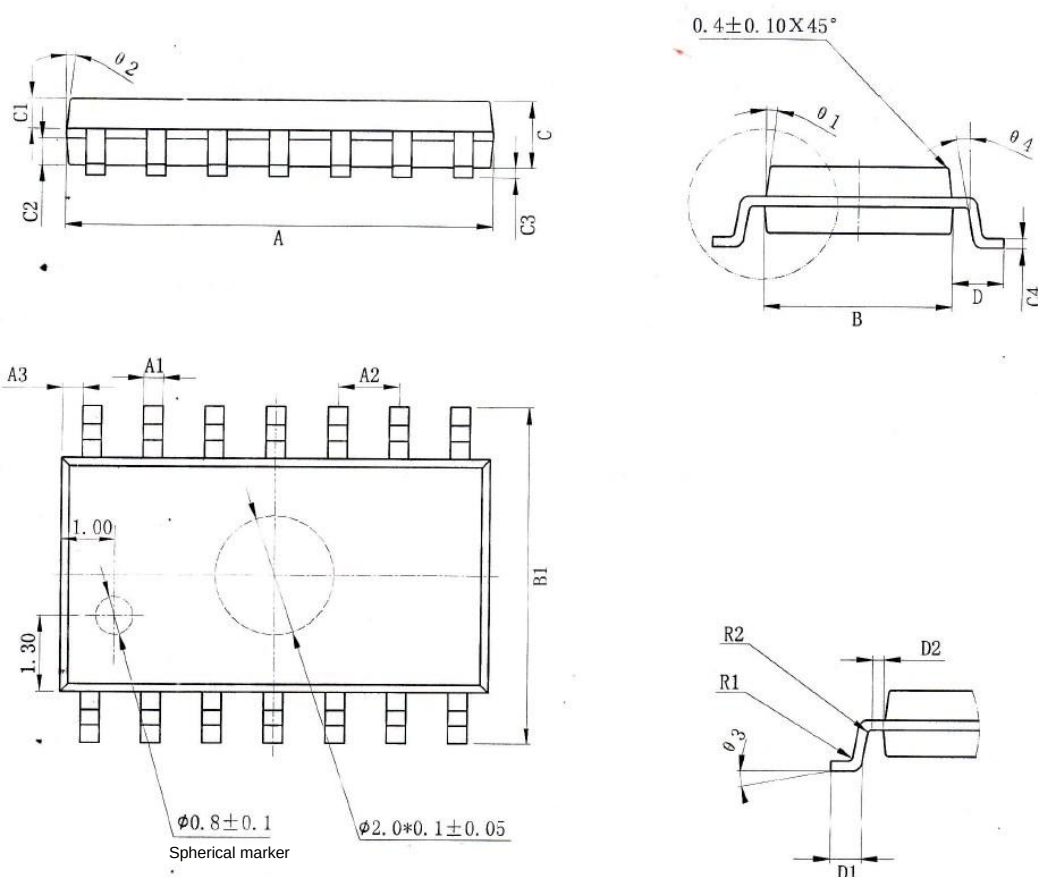


FIGURE 9

Package outline

SOP14



Symbol	Dimensions (mm)		Symbol	Dimensions (mm)	
	Min.	Max.		Min.	Max.
A	8.55	8.75	C4	0.203	0.233
A1	0.356	0.456	D	0.95	1.15
A2	1.27TYP		D1	0.40	0.70
A3	0.302TYP		D2	0.20TYP	
B	3.80	4.00	R1	0.20TYP	
B1	5.80	6.20	R2	0.20TYP	
C	1.40	1.60	θ1	8°~12°TYP	
C1	0.60	0.70	θ2	8°~12°TYP	
C2	0.52	0.62	θ3	0°~8°	
C3	0.05	0.25	θ4	4°~12°	