

# CD4011B, CD4012B, CD4023B Types

## CMOS NAND GATES

### High-Voltage Types (20-Volt Rating)

Quad 2 Input – CD4011B  
Dual 4 Input – CD4012B  
Triple 3 Input – CD4023B

■ CD4011B, CD4012B, and CD4023B NAND gates provide the system designer with direct implementation of the NAND function and supplement the existing family of CMOS gates. All inputs and outputs are buffered.

The CD4011B, CD4012B, and CD4023B types are supplied in 14-lead hermetic dual-in-line ceramic packages (F3A suffix), 14-lead dual-in-line plastic packages (E suffix), 14-lead small-outline packages (M, MT, M96, and NSR suffixes), and 14-lead thin shrink small-outline packages (PWR suffix). The CD4011B and CD4023B types also are supplied in 14-lead thin shrink small-outline packages (PW suffix).

### Features:

- Propagation delay time = 60 ns (typ.) at  $C_L = 50$  pF,  $V_{DD} = 10$  V
- Buffered inputs and outputs
- Standardized symmetrical output characteristics
- Maximum input current of  $1 \mu A$  at 18 V over full package temperature range; 100 nA at 18 V and 25°C
- 100% tested for quiescent current at 20 V
- 5-V, 10-V, and 15-V parametric ratings
- Noise margin (over full package temperature range):
  - 1 V at  $V_{DD} = 5$  V
  - 2 V at  $V_{DD} = 10$  V
  - 2.5 V at  $V_{DD} = 15$  V

- Meets all requirements of JEDEC Tentative Standard No. 13B, "Standard Specifications for Description of "B" Series CMOS Devices"

### MAXIMUM RATINGS, Absolute-Maximum Values:

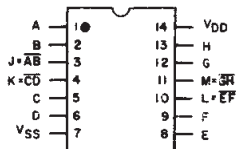
DC SUPPLY-VOLTAGE RANGE, ( $V_{DD}$ )	
Voltages referenced to $V_{SS}$ Terminal)	–0.5V to +20V
INPUT VOLTAGE RANGE, ALL INPUTS	–0.5V to $V_{DD} + 0.5$ V
DC INPUT CURRENT, ANY ONE INPUT	$\pm 10$ mA
POWER DISSIPATION PER PACKAGE ( $P_D$ ):	
For $T_A = -55^\circ\text{C}$ to $+100^\circ\text{C}$	500mW
For $T_A = +100^\circ\text{C}$ to $+125^\circ\text{C}$	Derate Linearly at 12mW/ $^\circ\text{C}$ to 200mW
DEVICE DISSIPATION PER OUTPUT TRANSISTOR	
For $T_A = \text{FULL PACKAGE-TEMPERATURE RANGE (All Package Types)}$	100mW
OPERATING-TEMPERATURE RANGE ( $T_A$ )	–55°C to +125°C
STORAGE TEMPERATURE RANGE ( $T_{stg}$ )	–65°C to +150°C
LEAD TEMPERATURE (DURING SOLDERING):	
At distance $1/16 \pm 1/32$ inch (1.59 $\pm$ 0.79mm) from case for 10s max	+265°C

### RECOMMENDED OPERATING CONDITIONS

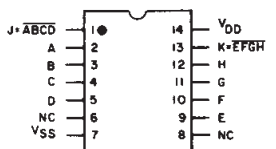
For maximum reliability, nominal operating conditions should be selected so that operation is always within the following ranges:

CHARACTERISTIC	LIMITS		UNITS
	MIN.	MAX.	
Supply-Voltage Range (For $T_A = \text{Full Package Temperature Range}$ )	3	18	V

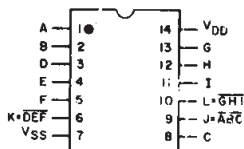
### TERMINAL ASSIGNMENTS



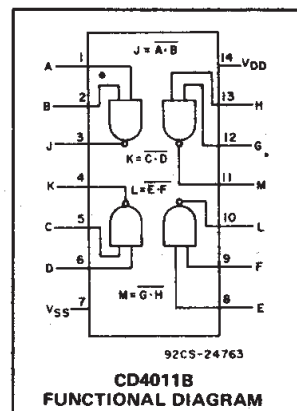
CD4011B



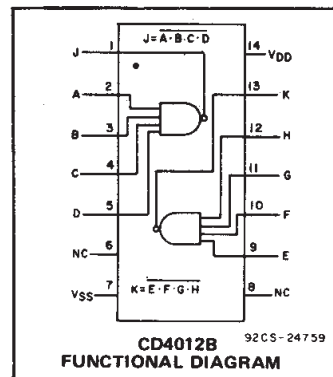
CD4012B



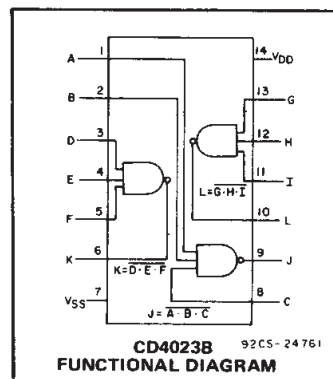
CD4023B



CD4011B  
FUNCTIONAL DIAGRAM



CD4012B  
FUNCTIONAL DIAGRAM



CD4023B  
FUNCTIONAL DIAGRAM

# CD4011B, CD4012B, CD4023B Types

## STATIC ELECTRICAL CHARACTERISTICS

CHARACTER- ISTIC	CONDITIONS			LIMITS AT INDICATED TEMPERATURES (°C)							UNITS
	V <sub>O</sub> (V)	V <sub>IN</sub> (V)	V <sub>DD</sub> (V)	+25							
				-55	-40	+85	+125	Min.	Typ.	Max.	
Quiescent Device Current, I <sub>DD</sub> Max.	—	0,5	5	0.25	0.25	7.5	7.5	—	0.01	0.25	μA
	—	0,10	10	0.5	0.5	15	15	—	0.01	0.5	
	—	0,15	15	1	1	30	30	—	0.01	1	
	—	0,20	20	5	5	150	150	—	0.02	5	
Output Low (Sink) Current I <sub>OL</sub> Min.	0.4	0,5	5	0.64	0.61	0.42	0.36	0.51	1	—	mA
	0.5	0,10	10	1.6	1.5	1.1	0.9	1.3	2.6	—	
	1.5	0,15	15	4.2	4	2.8	2.4	3.4	6.8	—	
Output High (Source) Current, I <sub>OH</sub> Min.	4.6	0,5	5	-0.64	-0.61	-0.42	-0.36	-0.51	-1	—	mA
	2.5	0,5	5	-2	-1.8	-1.3	-1.15	-1.6	-3.2	—	
	9.5	0,10	10	-1.6	-1.5	-1.1	-0.9	-1.3	-2.6	—	
	13.5	0,15	15	-4.2	-4	-2.8	-2.4	-3.4	-6.8	—	
Output Voltage: Low-Level, V <sub>OL</sub> Max.	—	0,5	5	0.05				—	0	0.05	V
	—	0,10	10	0.05				—	0	0.05	
	—	0,15	15	0.05				—	0	0.05	
Output Voltage: High-Level, V <sub>OH</sub> Min.	—	0,5	5	4.95				4.95	5	—	V
	—	0,10	10	9.95				9.95	10	—	
	—	0,15	15	14.95				14.95	15	—	
Input Low Voltage, V <sub>IL</sub> Max.	4.5	—	5	1.5				—	—	1.5	V
	9	—	10	3				—	—	3	
	13.5	—	15	4				—	—	4	
Input High Voltage, V <sub>IH</sub> Min.	0.5,4.5	—	5	3.5				3.5	—	—	V
	1,9	—	10	7				7	—	—	
	1.5,13.5	—	15	11				11	—	—	
Input Current I <sub>IN</sub> Max.		0,18	18	±0.1	±0.1	±1	±1	—	±10 <sup>-5</sup>	±0.1	μA

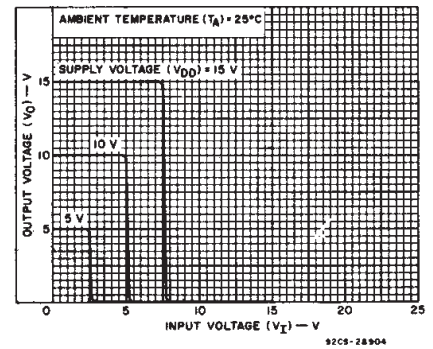


Fig. 1 — Typical voltage transfer characteristics.

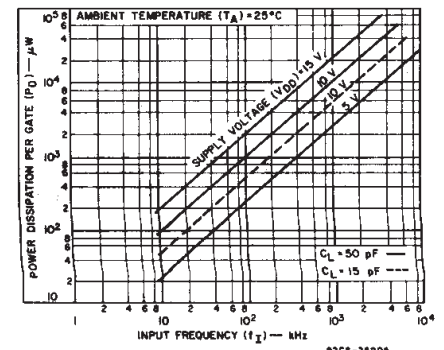


Fig. 2 — Typical power dissipation characteristics.

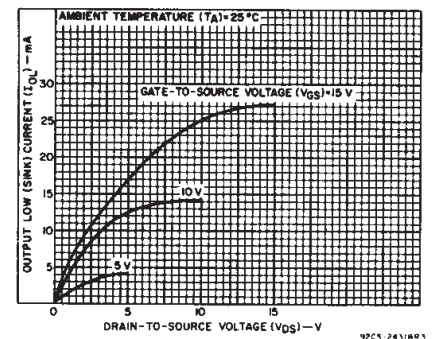


Fig. 3 — Typical output low (sink) current characteristics.

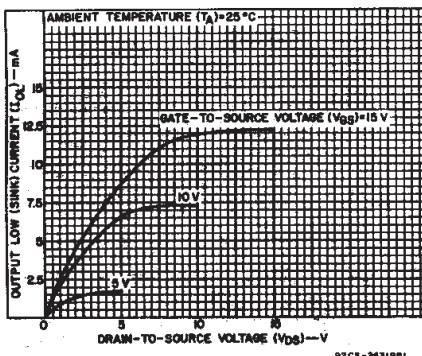


Fig. 4 — Minimum output low (sink) current characteristics.

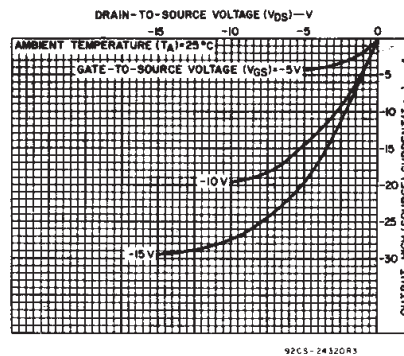


Fig. 5 — Typical output high (source) current characteristics.

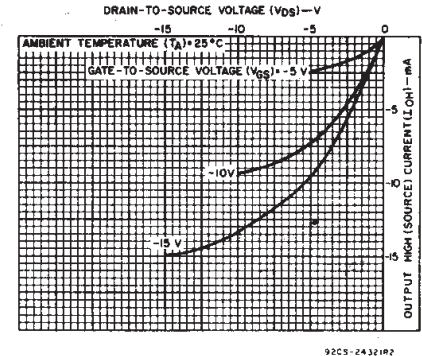
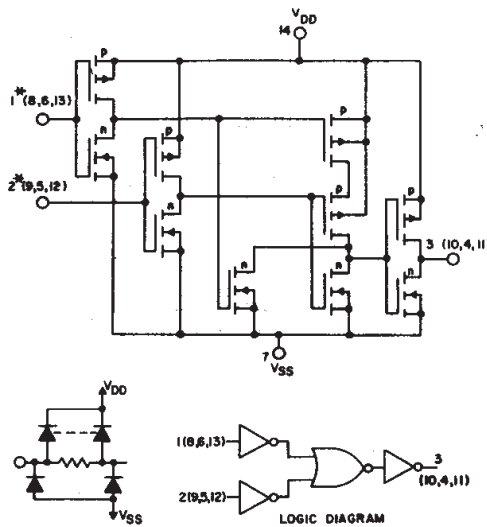


Fig. 6 — Minimum output high (source) current characteristics.

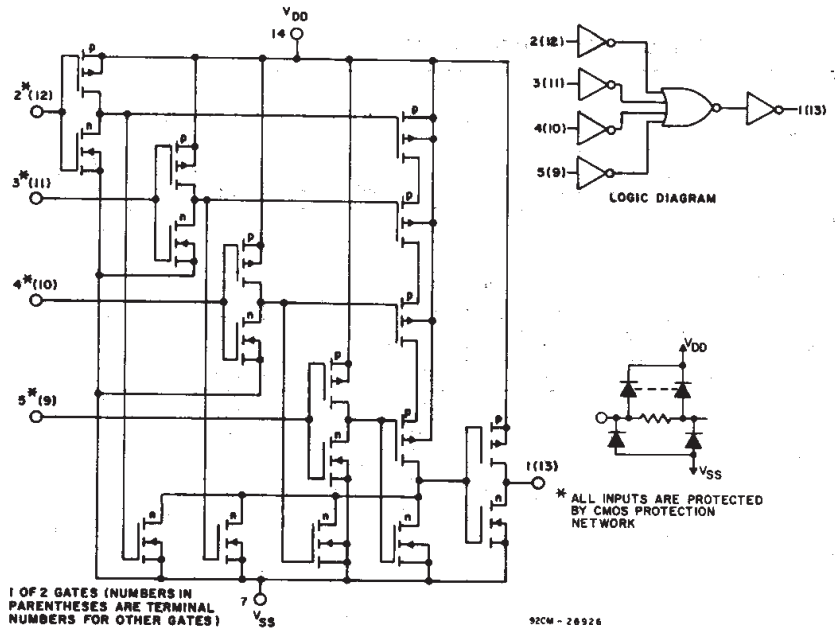
## CD4011B, CD4012B, CD4023B Types



\* ALL INPUTS ARE PROTECTED BY CMOS PROTECTION NETWORK

1 OF 4 GATES (NUMBERS IN PARENTHESES ARE TERMINAL NUMBERS FOR OTHER GATES)

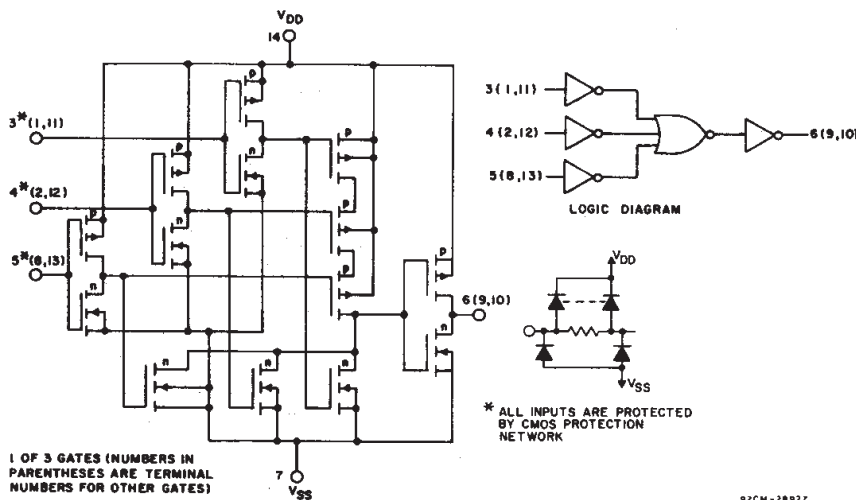
Fig. 7 - Schematic and logic diagrams for CD4011B.



1 OF 2 GATES (NUMBERS IN PARENTHESES ARE TERMINAL NUMBERS FOR OTHER GATES)

92CM-28926

Fig. 8 - Schematic and logic diagrams for CD4012B.



1 OF 3 GATES (NUMBERS IN PARENTHESES ARE TERMINAL NUMBERS FOR OTHER GATES)

\* ALL INPUTS ARE PROTECTED BY CMOS PROTECTION NETWORK

Fig. 9 - Schematic and logic diagrams for CD4023B.

92CM-28927

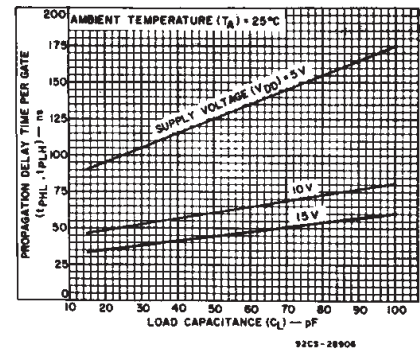


Fig. 10 - Typical propagation delay time per gate as a function of load capacitance.

### DYNAMIC ELECTRICAL CHARACTERISTICS

At  $T_A = 25^\circ\text{C}$ ; Input  $t_r, t_f = 20\text{ ns}$ ,  $C_L = 50\text{ pF}$ ,  $R_L = 200\text{ k}\Omega$

CHARACTERISTIC	TEST CONDITIONS	LIMITS		UNITS
		V <sub>DD</sub> VOLTS	TYP.	MAX.
Propagation Delay Time, $t_{PHL}, t_{PLH}$		5	125	250
		10	60	120
		15	45	90
Transition Time, $t_{THL}, t_{TLH}$		5	100	200
		10	50	100
		15	40	80
Input Capacitance, $C_{IN}$	Any Input		5	7.5
				pF

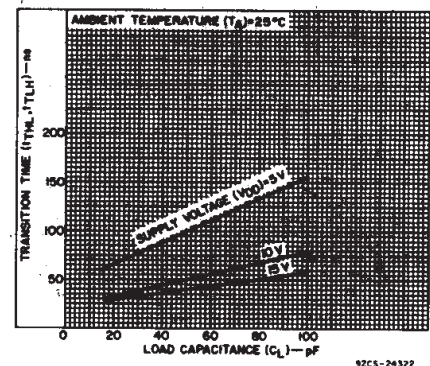


Fig. 11 - Typical transition time as a function of load capacitance.

## CD4011B, CD4012B, CD4023B Types

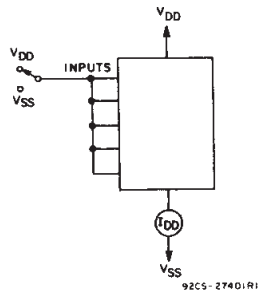


Fig. 12 - Quiescent-device-current test circuit.

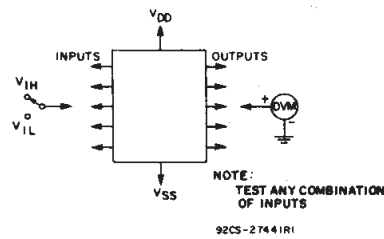


Fig. 13 - Input-voltage test circuit.

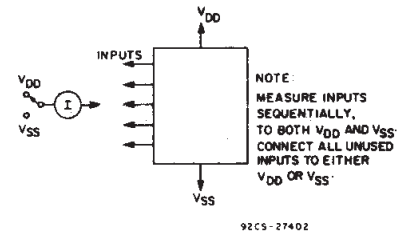
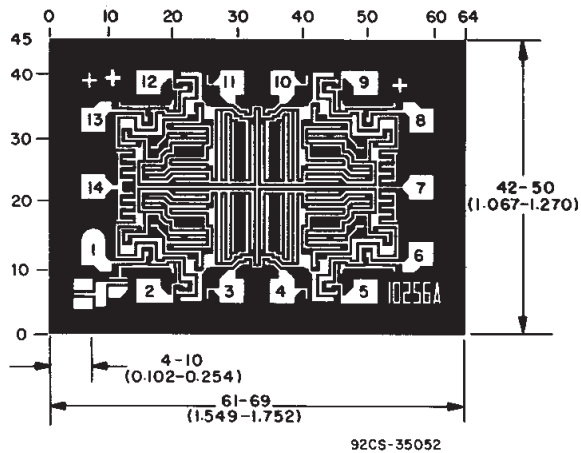
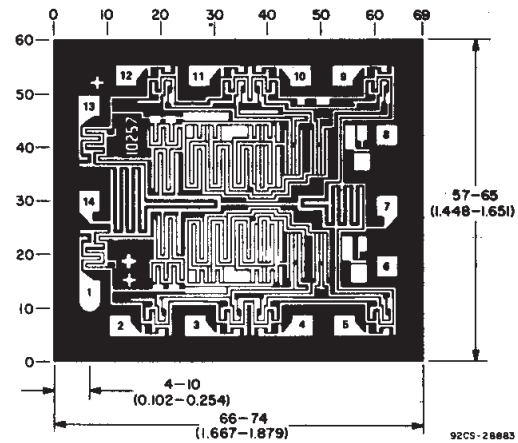


Fig. 14 - Input-current test circuit.

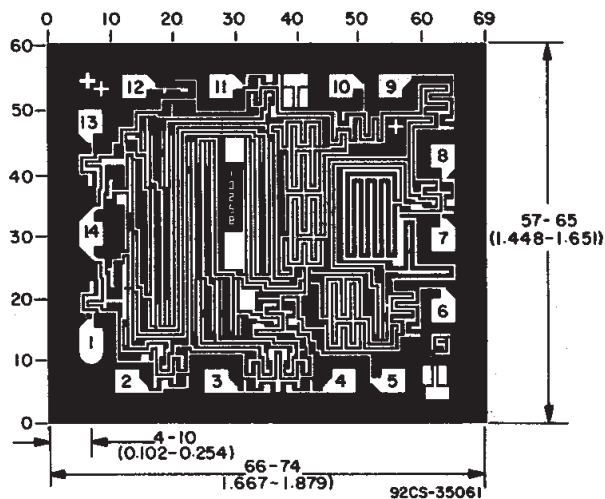
### Chip Dimensions and Pad Layouts



CD4011BH



CD4012BH



CD4023BH

Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils ( $10^{-3}$  inch).

**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
89265AKB3T	OBSOLETE	CFP	WR	14		TBD	Call TI	Call TI	-55 to 125		
89266AKB3T	OBSOLETE	CFP	WR	16		TBD	Call TI	Call TI	-55 to 125		
89273AKB3T	OBSOLETE	CFP	WR	14		TBD	Call TI	Call TI	-55 to 125		
CD4011BE	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD4011BE	<a href="#">Samples</a>
CD4011BEE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD4011BE	<a href="#">Samples</a>
CD4011BF	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD4011BF	<a href="#">Samples</a>
CD4011BF3A	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD4011BF3A	<a href="#">Samples</a>
CD4011BF3AS2534	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI			
CD4011BK3	OBSOLETE	CFP	WR	14		TBD	Call TI	Call TI	-55 to 125		
CD4011BM	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BM96	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BM96E4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BM96G4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BME4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BMG4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BMT	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BMTE4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BMTG4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4011BM	<a href="#">Samples</a>
CD4011BNSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4011B	<a href="#">Samples</a>
CD4011BNSRE4	ACTIVE	SO	NS	14		TBD	Call TI	Call TI	-55 to 125	CD4011B	<a href="#">Samples</a>

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
CD4011BNSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4011B	<a href="#">Samples</a>
CD4011BPW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CM011B	<a href="#">Samples</a>
CD4011BPWE4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CM011B	<a href="#">Samples</a>
CD4011BPWG4	ACTIVE	TSSOP	PW	14		TBD	Call TI	Call TI	-55 to 125	CM011B	<a href="#">Samples</a>
CD4011BPWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CM011B	<a href="#">Samples</a>
CD4011BPWRE4	ACTIVE	TSSOP	PW	14		TBD	Call TI	Call TI	-55 to 125	CM011B	<a href="#">Samples</a>
CD4011BPWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CM011B	<a href="#">Samples</a>
CD4012BE	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD4012BE	<a href="#">Samples</a>
CD4012BEE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD4012BE	<a href="#">Samples</a>
CD4012BF3A	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD4012BF3A	<a href="#">Samples</a>
CD4012BF3AS2534	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI			
CD4012BM	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4012BM	<a href="#">Samples</a>
CD4012BM96	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4012BM	<a href="#">Samples</a>
CD4012BM96E4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4012BM	<a href="#">Samples</a>
CD4012BM96G4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4012BM	<a href="#">Samples</a>
CD4012BME4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4012BM	<a href="#">Samples</a>
CD4012BMG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4012BM	<a href="#">Samples</a>
CD4012BMT	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4012BM	<a href="#">Samples</a>
CD4012BMTE4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4012BM	<a href="#">Samples</a>



Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
CD4012BMTG4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4012BM	<a href="#">Samples</a>
CD4012BNSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4012B	<a href="#">Samples</a>
CD4012BNSRE4	ACTIVE	SO	NS	14		TBD	Call TI	Call TI	-55 to 125	CD4012B	<a href="#">Samples</a>
CD4012BNSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4012B	<a href="#">Samples</a>
CD4012BPWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CM012B	<a href="#">Samples</a>
CD4012BPWRE4	ACTIVE	TSSOP	PW	14		TBD	Call TI	Call TI	-55 to 125	CM012B	<a href="#">Samples</a>
CD4012BPWRG4	ACTIVE	TSSOP	PW	14		TBD	Call TI	Call TI	-55 to 125	CM012B	<a href="#">Samples</a>
CD4023BE	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD4023BE	<a href="#">Samples</a>
CD4023BEE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD4023BE	<a href="#">Samples</a>
CD4023BF	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD4023BF	<a href="#">Samples</a>
CD4023BF3A	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD4023BF3A	<a href="#">Samples</a>
CD4023BF3AS2534	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI			
CD4023BM	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4023BM	<a href="#">Samples</a>
CD4023BM96	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4023BM	<a href="#">Samples</a>
CD4023BM96E4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4023BM	<a href="#">Samples</a>
CD4023BM96G4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4023BM	<a href="#">Samples</a>
CD4023BME4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4023BM	<a href="#">Samples</a>
CD4023BMG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4023BM	<a href="#">Samples</a>
CD4023BMT	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4023BM	<a href="#">Samples</a>
CD4023BMTE4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4023BM	<a href="#">Samples</a>

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
CD4023BMTG4	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	CD4023BM	<a href="#">Samples</a>
CD4023BNSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4023B	<a href="#">Samples</a>
CD4023BNSRE4	ACTIVE	SO	NS	14		TBD	Call TI	Call TI	-55 to 125	CD4023B	<a href="#">Samples</a>
CD4023BNSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CD4023B	<a href="#">Samples</a>
CD4023BPW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CM023B	<a href="#">Samples</a>
CD4023BPWE4	ACTIVE	TSSOP	PW	14		TBD	Call TI	Call TI	-55 to 125	CM023B	<a href="#">Samples</a>
CD4023BPWG4	ACTIVE	TSSOP	PW	14		TBD	Call TI	Call TI	-55 to 125	CM023B	<a href="#">Samples</a>
CD4023BPWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	CM023B	<a href="#">Samples</a>
CD4023BPWRE4	ACTIVE	TSSOP	PW	14		TBD	Call TI	Call TI	-55 to 125	CM023B	<a href="#">Samples</a>
CD4023BPWRG4	ACTIVE	TSSOP	PW	14		TBD	Call TI	Call TI	-55 to 125	CM023B	<a href="#">Samples</a>
JM38510/05051BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 05051BCA	<a href="#">Samples</a>
JM38510/05052BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 05052BCA	<a href="#">Samples</a>
JM38510/05053BCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 05053BCA	<a href="#">Samples</a>
M38510/05051BCA	ACTIVE	CDIP	J	14		TBD	Call TI	Call TI	-55 to 125	JM38510/ 05051BCA	<a href="#">Samples</a>
M38510/05052BCA	ACTIVE	CDIP	J	14		TBD	Call TI	Call TI	-55 to 125	JM38510/ 05052BCA	<a href="#">Samples</a>
M38510/05053BCA	ACTIVE	CDIP	J	14		TBD	Call TI	Call TI	-55 to 125	JM38510/ 05053BCA	<a href="#">Samples</a>

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.



(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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**OTHER QUALIFIED VERSIONS OF CD4011B, CD4011B-MIL, CD4012B, CD4012B-MIL :**

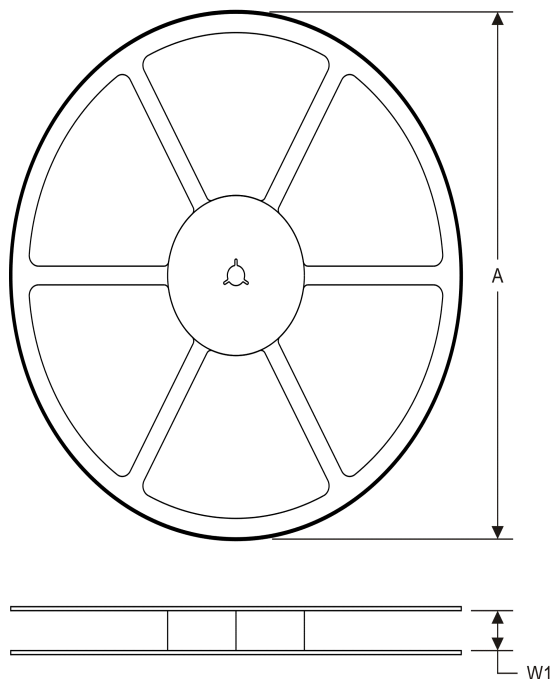
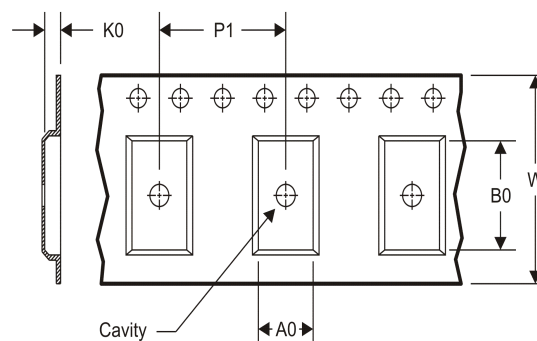
● Catalog: [CD4011B](#), [CD4012B](#)

● Military: [CD4011B-MIL](#), [CD4012B-MIL](#)

NOTE: Qualified Version Definitions:

● Catalog - TI's standard catalog product

- 
- Military - QML certified for Military and Defense Applications

**TAPE AND REEL INFORMATION**
**REEL DIMENSIONS**

**TAPE DIMENSIONS**


A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

**TAPE AND REEL INFORMATION**

\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD4011BM96	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
CD4011BMT	SOIC	D	14	250	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
CD4011BNSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
CD4011BPWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
CD4012BM96	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
CD4012BMT	SOIC	D	14	250	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
CD4012BNSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
CD4012BPWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
CD4023BM96	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
CD4023BMT	SOIC	D	14	250	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
CD4023BNSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
CD4023BPWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD4011BM96	SOIC	D	14	2500	367.0	367.0	38.0
CD4011BMT	SOIC	D	14	250	367.0	367.0	38.0
CD4011BNSR	SO	NS	14	2000	367.0	367.0	38.0
CD4011BPWR	TSSOP	PW	14	2000	367.0	367.0	35.0
CD4012BM96	SOIC	D	14	2500	367.0	367.0	38.0
CD4012BMT	SOIC	D	14	250	367.0	367.0	38.0
CD4012BNSR	SO	NS	14	2000	367.0	367.0	38.0
CD4012BPWR	TSSOP	PW	14	2000	367.0	367.0	35.0
CD4023BM96	SOIC	D	14	2500	367.0	367.0	38.0
CD4023BMT	SOIC	D	14	250	367.0	367.0	38.0
CD4023BNSR	SO	NS	14	2000	367.0	367.0	38.0
CD4023BPWR	TSSOP	PW	14	2000	367.0	367.0	35.0

J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE



PINS ** DIM	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package is hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



PINS ** DIM	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-001 VARIATION	AA	BB	AC	AD



4040049/E 12/2002

NOTES:

- A. All linear dimensions are in inches (millimeters).  
B. This drawing is subject to change without notice.
-  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).  
 The 20 pin end lead shoulder width is a vendor option, either half or full width.



D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AB.

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



4040064-3/G 02/11

- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
  - D. Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
  - E. Falls within JEDEC MO-153

PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



4211284-2/F 12/12

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

# MECHANICAL DATA

NS (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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