



## CD4069

CMOS IC

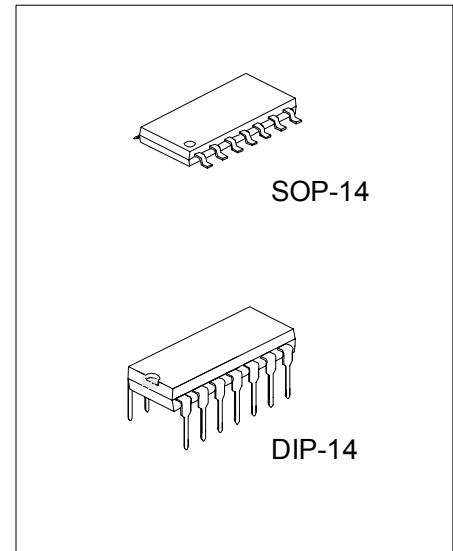
### INVERTER CIRCUIT

#### DESCRIPTION

The UTC **CD4069** is a CMOS IC with six inverter circuits and designed for using of wide power supply operating range, low power consumption, high noise immunity, and symmetric controlled rise and fall times. The IC is capable of ESD protection by diode clamps to VDD and VSS.

#### FEATURES

- \* Wide supply voltage range: 3.0V ~ 15V.
- \* High noise immunity: 0.45 V<sub>DD</sub> typ.
- \* Low Power TTL compatibility: Fan out of 2 driving 74L or 1 driving 74LS.



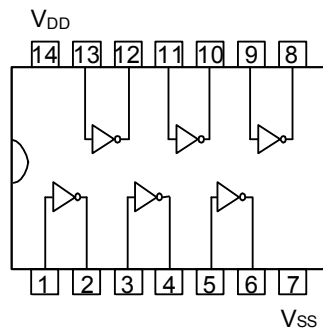
\*Pb-free plating product number: CD4069L

#### ORDERING INFORMATION

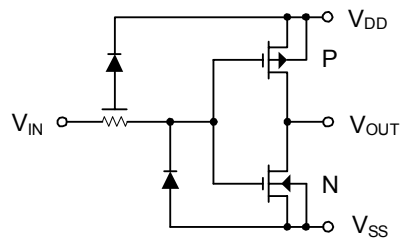
Order Number		Package	Packing
Normal	Lead Free Plating		
CD4069-D14-T	CD4069L-D14-T	DIP-14	Tube
CD4069-S14-R	CD4069L-S14-R	SOP-14	Tape Reel
CD4069-S14-T	CD4069L-S14-T	SOP-14	Tube

<p>CD4069L-D14-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) D14: DIP-14, S14: SOP-14 (3) L: Lead Free Plating, Blank: Pb/Sn</p>
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## ■ PIN CONFIGURATION



## ■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
DC Supply Voltage	$V_{DD}$	-0.5 ~ +18	V
Input Voltage	$V_{IN}$	-0.5 ~ $V_{DD} + 0.5$	V
Storage Temperature Range	$T_S$	-65 ~ +150	
Power Dissipation	DIP-14	$P_D$	700
	SOP-14		500
Junction Temperature	$T_J$	125	
Operating Temperature	$T_{OPR}$	-20 ~ +85	
Storage Temperature	$T_{STG}$	-40 ~ +150	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ RECOMMENDED OPERATING CONDITIONS ( $V_{SS}=0V$ )

PARAMETER	SYMBOL	RATINGS	UNIT
DC Supply Voltage	$V_{DD}$	3 ~ 15	V
Input Voltage	$V_{IN}$	0 ~ $V_{DD}$	V
Operating Temperature Range	$T_a$	-40 ~ +85	

## ■ DC ELECTRICAL CHARACTERISTICS ( $V_{SS}=0V$ , $T_a=25$ , unless otherwise specified.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Device Current	$I_{DD}$	$V_{DD}=5V$ , $V_{IN}=V_{DD}$ or $V_{SS}$ $V_{DD}=10V$ , $V_{IN}=V_{DD}$ or $V_{SS}$ $V_{DD}=15V$ , $V_{IN}=V_{DD}$ or $V_{SS}$			1.0 2.0 4.0	$\mu A$
Low Level Output Voltage	$V_{OL}$	$ I_O  < 1\mu A$ $V_{DD}=5V$ $V_{DD}=10V$ $V_{DD}=15V$		0 0 0	0.05 0.05 0.05	V
High Level Output Voltage	$V_{OH}$	$ I_O  < 1\mu A$ $V_{DD}=5V$ $V_{DD}=10V$ $V_{DD}=15V$	4.95 9.95 14.95			V
Low Level Input Voltage	$V_{IL}$	$ I_O  < 1\mu A$ $V_{DD}=5V$ , $V_{OUT}=4.5V$ $V_{DD}=10V$ , $V_{OUT}=9V$ $V_{DD}=15V$ , $V_{OUT}=13.5V$			1.0 2.0 3.0	V
High Level Input Voltage	$V_{IH}$	$ I_O  < 1\mu A$ $V_{DD}=5V$ , $V_{OUT}=0.5V$ $V_{DD}=10V$ , $V_{OUT}=1V$ $V_{DD}=15V$ , $V_{OUT}=1.5V$	4.0 8.0 12.0			V
Low Level Output Current (Note 3)	$I_{OL}$	$V_{DD}=5V$ , $V_{OUT}=0.4V$ $V_{DD}=10V$ , $V_{OUT}=0.5V$ $V_{DD}=15V$ , $V_{OUT}=1.5V$	0.44 1.1 3.0	0.88 2.25 8.8		mA
High Level Output Current (Note 3)	$I_{OH}$	$V_{DD}=5V$ , $V_{OUT}=4.6V$ $V_{DD}=10V$ , $V_{OUT}=9.5V$ $V_{DD}=15V$ , $V_{OUT}=13.5V$	-0.44 -1.1 -3.0	-0.88 -2.25 -8.8		mA
Input Current	$I_{IN}$	$V_{DD}=15V$ , $V_{IN}=0V$ $V_{DD}=15V$ , $V_{IN}=15V$		$-10^{-5}$ $10^{-5}$	-0.30 0.30	$\mu A$

### ■ AC ELECTRICAL CHARACTERISTICS(Note 1)

(Ta=25 , CL=50pF, RL=200kΩ, tr and tr ≤ 20 ns, unless otherwise specified)

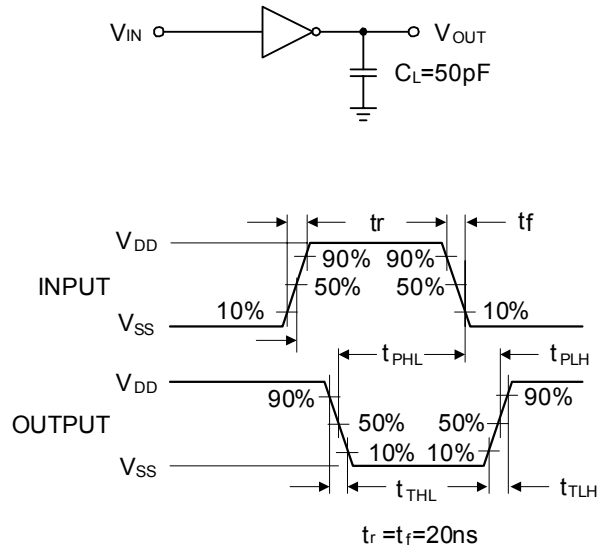
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay Time from Input to Output	t <sub>PHL</sub> or t <sub>PLH</sub>	V <sub>DD</sub> =5V V <sub>DD</sub> =10V V <sub>DD</sub> =15V		50 30 25	90 60 50	ns
Transition Time	t <sub>THL</sub> or t <sub>TLH</sub>	V <sub>DD</sub> =5V V <sub>DD</sub> =10V V <sub>DD</sub> =15V		80 50 40	150 100 80	ns
Average Input Capacitance	C <sub>IN</sub>	Any Gate		6	15	pF
Power Dissipation Capacitance	C <sub>PD</sub>	Any Gate (Note 3)		12		pF

Note: 1.AC Parameters are guaranteed by DC correlated testing.

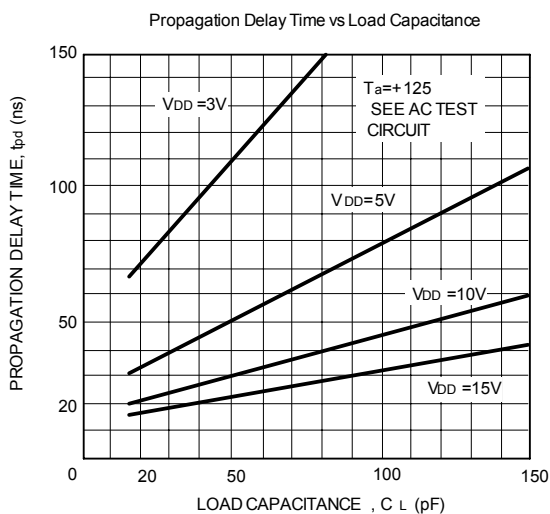
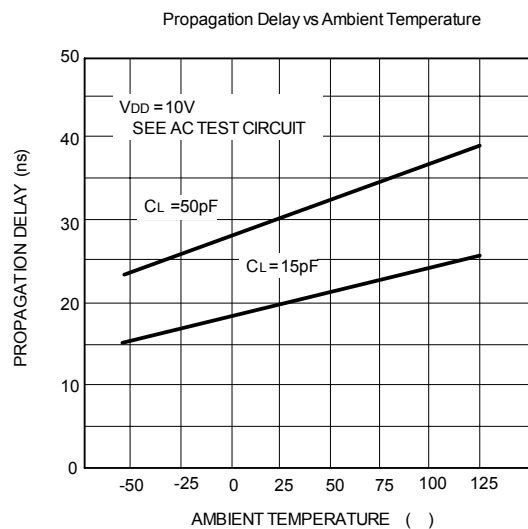
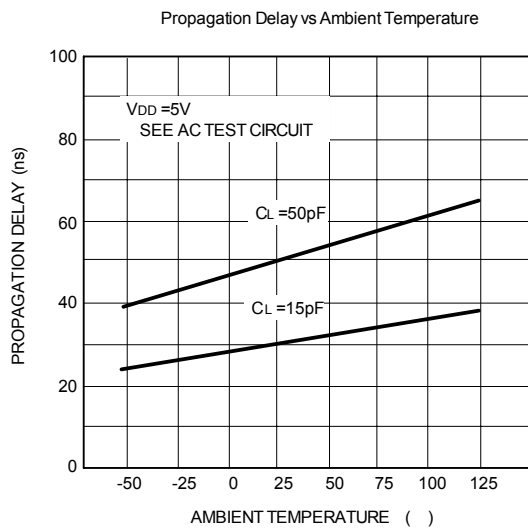
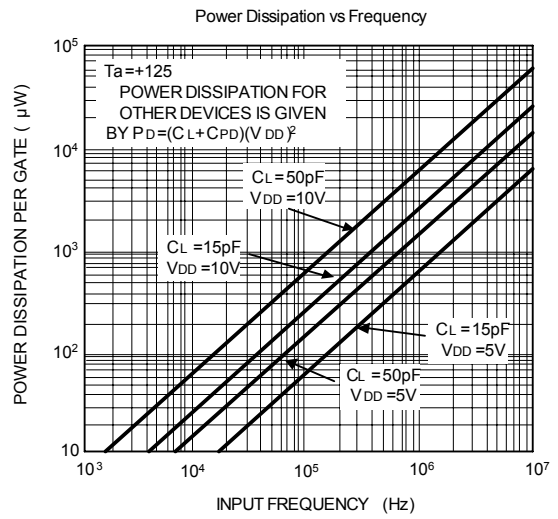
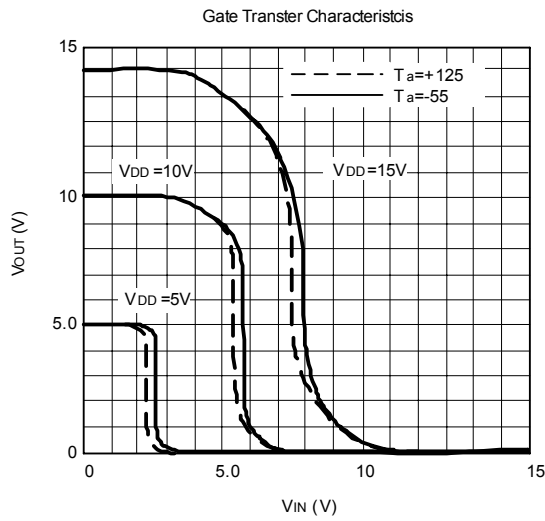
2: I<sub>OH</sub> and I<sub>OL</sub> are tested one output at a time.

3: C<sub>PD</sub> determines the no load AC power consumption of any CMOS device.

■ AC TEST CIRCUITS AND SWITCHING TIME WAVEFORMS



## TYPICAL CHARACTERISTICS



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