

TC74HC4072P DUAL 4-INPUT OR GATE

The TC74HC4072 is a high speed CMOS 4-INPUT OR GATE fabricated with silicon gate C²MOS technology.

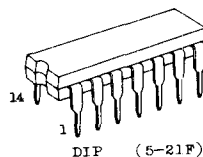
It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

The internal circuit is composed of 3 stage including buffer output, which enables high noise immunity and stable output.

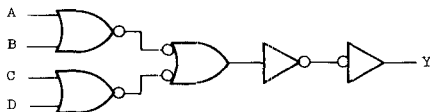
All inputs are equipped with protection circuits against static discharge or excess voltage.

FEATURES:

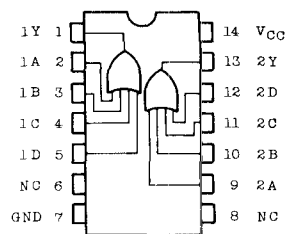
- . High Speed..... $t_{pd}=11ns$ (Typ.)($V_{CC}=5V$)
- . Low Power Dissipation..... $I_{CC}=1\mu A$ (Max.)($T_a=25^\circ C$)
- . High Noise Immunity..... $V_{NIH}=V_{NIL}=28\% V_{CC}$ (Min.)
- . Output Drive Capability.....10 LSTTL Loads
- . Symmetrical Output Impedance... $|I_{OH}|=I_{OL}=4mA$ (Min.)
- . Balanced Propagation Delays.... $t_{pLH}\approx t_{pHL}$
- . Wide Operating Voltage Range... $V_{CC}(opr)=2V\sim 6V$
- . Pin and Function Compatible with 4072B



LOGIC DIAGRAM (1/2 OF DEVICE SHOWN)



PIN ASSIGNMENT



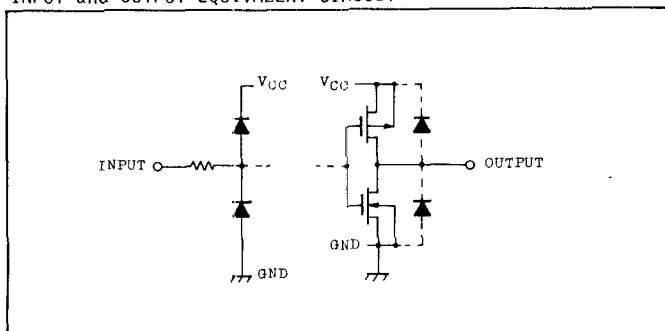
(Top View)

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	$-0.5 \sim 7$	V
DC Input Voltage	V_{IN}	$-0.5 \sim V_{CC}+0.5$	V
DC Output Voltage	V_{OUT}	$-0.5 \sim V_{CC}+0.5$	V
Input Diode Current	I_{IK}	± 20	mA
Output Diode Current	I_{OK}	± 20	mA
DC Output Current	I_{OUT}	± 25	mA
DC V_{CC} /Ground Current	I_{CC}	± 50	mA
Power Dissipation	P_D	500*	mW
Storage Temperature	T_{stg}	$-65 \sim 150$	$^{\circ}\text{C}$
Lead Temperature 10sec	T_L	300	$^{\circ}\text{C}$

* 500mW in the range of $T_a = -40 \sim 65^{\circ}\text{C}$. and from $T_a = 65^{\circ}\text{C}$ up to 85°C derating factor of $-10\text{mW}/^{\circ}\text{C}$ shall be applied until 300mW.

INPUT and OUTPUT EQUIVALENT CIRCUIT



TC74HC4072P

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	LIMIT	UNIT
Supply Voltage	V _{CC}	2 ~ 6	V
Input Voltage	V _{IN}	0 ~ V _{CC}	V
Output Voltage	V _{OUT}	0 ~ V _{CC}	V
Operating Temperature	T _{opr}	-40 ~ 85	°C
Input Rise and Fall Time	t _r , t _f	0~1000 (V _{CC} =2.0V)	ns
		0 ~ 500 (V _{CC} =4.5V)	
		0 ~ 400 (V _{CC} =6.0V)	

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION		Ta=25°C				Ta=-40~85°C		UNIT
				V _{CC}	MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Input Voltage	V _{IH}			2.0	1.5	-	-	1.5	-	V
				4.5	3.15	-	-	3.15	-	
				6.0	4.2	-	-	4.2	-	
Low-Level Input Voltage	V _{IL}			2.0	-	-	0.5	-	0.5	V
				4.5	-	-	1.35	-	1.35	
				6.0	-	-	1.8	-	1.8	
High-Level Output Voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} =-20μA	2.0	1.9	2.0	-	1.9	-	V
				4.5	4.4	4.5	-	4.4	-	
				6.0	5.9	6.0	-	5.9	-	
			I _{OH} =-4mA	4.5	4.18	4.31	-	4.13	-	
			I _{OH} =-5.2mA	6.0	5.68	5.80	-	5.63	-	
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} =20μA	2.0	-	0.0	0.1	-	0.1	V
				4.5	-	0.0	0.1	-	0.1	
				6.0	-	0.0	0.1	-	0.1	
			I _{OL} =4mA	4.5	-	0.17	0.32	-	0.37	
			I _{OL} =5.2mA	6.0	-	0.18	0.32	-	0.37	
Input Leakage Current	I _{IN}	V _{IN} =V _{CC} or GND	6.0	-	-	±0.1	-	±1.0	μA	
Quiescent Supply Current	I _{CC}	V _{IN} =V _{CC} or GND	6.0	-	-	4.0	-	40.0		

AC ELECTRICAL CHARACTERISTICS ($C_L=50\text{pF}$, Input $t_r=t_f=6\text{ns}$)

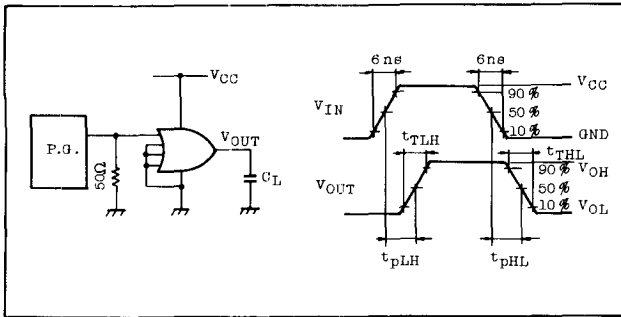
PARAMETER	SYMBOL	TEST CONDITION	$T_a=25^\circ\text{C}$				$T_a=-40\sim 85^\circ\text{C}$		UNIT
			V_{CC}	MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	t_{TLH} t_{THL}		2.0	-	30	75	-	90	ns
			4.5	-	8	15	-	18	
			6.0	-	7	13	-	16	
Propagation Delay Time	t_{PLH} t_{PHL}		2.0	-	50	110	-	130	
			4.5	-	14	22	-	26	
			6.0	-	12	19	-	23	
Input Capacitance	C_{IN}		-	-	5	10	-	10	pF
Power Dissipation Capacitance	$C_{PD(1)}$		-	-	28	-	-	-	

Note (1) C_{PD} is defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit).

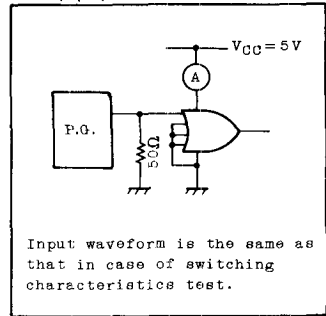
Average operating current can be obtained by the equation hereunder.

$$I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/2 \quad (\text{per Gate})$$

SWITCHING CHARACTERISTICS TEST CIRCUIT and WAVEFORM

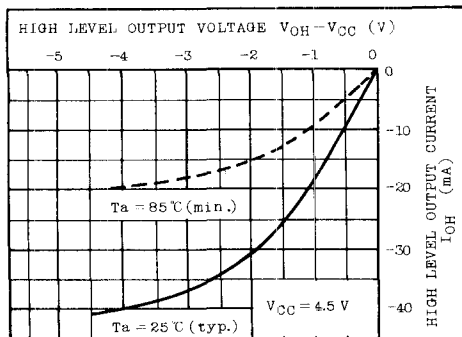


$I_{CC(opr)}$ TEST CIRCUIT

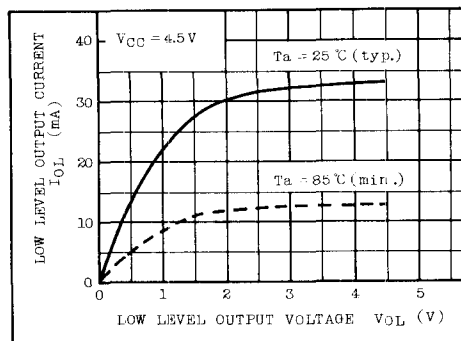


TC74HC4072P

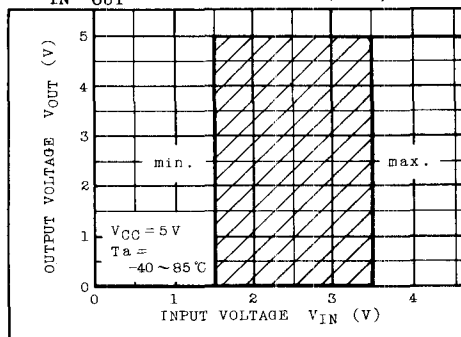
I_{OH} CHARACTERISTICS



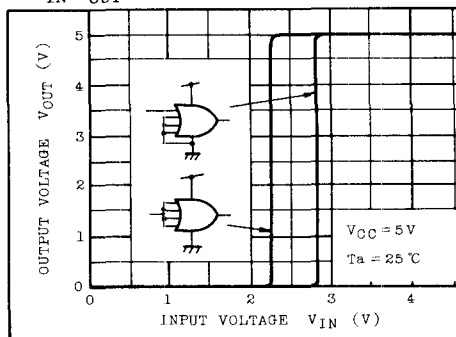
I_{OL} CHARACTERISTICS



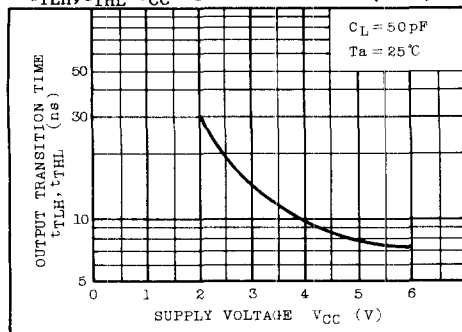
$V_{IN}-V_{OUT}$ CHARACTERISTICS (MIN., MAX.)



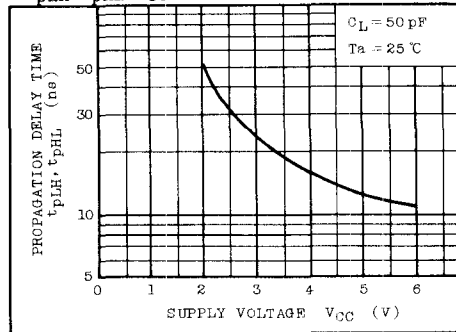
$V_{IN}-V_{OUT}$ CHARACTERISTICS (TYP.)



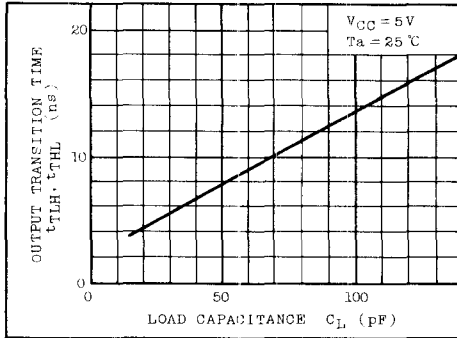
$t_{TLH}, t_{THL}-V_{CC}$ CHARACTERISTICS (TYP.)



$t_{PLH}, t_{PHL}-V_{CC}$ CHARACTERISTICS (TYP.)



$t_{TLH}, t_{THL}-C_L$ CHARACTERISTICS (TYP.)



$t_{PLH}, t_{PHL}-C_L$ CHARACTERISTICS (TYP.)

