

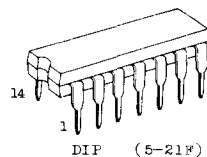
TC74HC4066P QUAD BILATERAL SWITCH

The TC74HC4066 is a high speed CMOS QUAD BILATERAL SWITCH fabricated with silicon gate C²MOS technology.

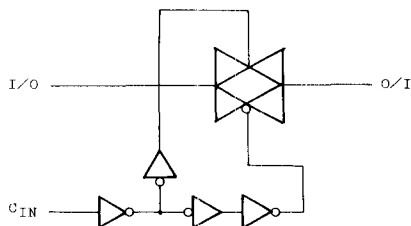
It consists of four independent high speed switches capable of controlling either digital or analog signals with as low power dissipation as that of metal-gate C²MOS IC. C input is provided to control the switch; the switch is ON while the C input is maintained at high level, and the switch is OFF while at low level.

FEATURES:

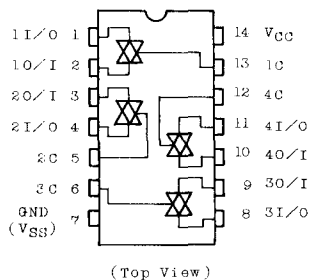
- . High Speed..... $t_{pd}=12\text{ns}(\text{Typ.})$ ($V_{CC}=5\text{V}$)
- . Low Power Dissipation..... $I_{CC}=1\mu\text{A}(\text{Max.})$ ($T_a=25^\circ\text{C}$)
- . High Noise Immunity..... $V_{NIH}=V_{NIL}=28\% V_{CC}(\text{Min.})$
- . Low ON Resistance..... $R_{ON}=80\Omega(\text{Typ.})$ ($V_{CC}=5\text{V}$)
- . High Degree of Linarity..... $\text{DISTORTION}=0.05\%(\text{Typ.})$ ($V_{CC}=5\text{V}$)
- . Pin and Function Compatible with 4066B



LOGIC DIAGRAM (PER CHANNEL)



PIN ASSIGNMENT



TC74HC4066P

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V _{CC}	-0.5 ~ 7	V
DC Input Voltage	V _{IN}	-0.5 ~ V _{CC} +0.5	V
DC Output Voltage	V _{OUT}	-0.5 ~ 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 ~ 150	°C
Lead Temperature 10sec	T _L	300	°C

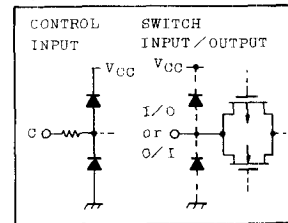
* 500mW in the range of Ta=-40°C ~ 65°C.
and from Ta=65°C up to 85°C derating factor of -10mW/°C shall be applied until 300mW.

** 0 ~ 500ns at V_{CC}=4.5V and this value shall be depend upon V_{CC} as follows.
0 ~ 1000ns (V_{CC}=2V)
0 ~ 400ns (V_{CC}=6V)

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 ~ 500**	ns

INPUT and OUTPUT EQUIVALENT CIRCUIT



DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	Ta=25°C				Ta=-40~85°C		UNIT
			V _{CC}	MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Control Input Voltage	V _{IH}	Refer to R _{ON} specification	2.0	1.5	-	-	1.5	-	V
			4.5	3.15	-	-	3.15	-	
			6.0	4.2	-	-	4.2	-	
Low-Level Control Input Voltage	V _{IL}	I _{OFF} ≤ 1.0μA	2.0	-	-	0.5	-	0.5	V
			4.5	-	-	1.35	-	1.35	
			6.0	-	-	1.8	-	1.8	
ON Resistance	R _{ON}	V _C =V _{IHC} V _{I/O} =0 ~ V _{CC} I _{I/O} =100μA	2.0	-	2000	-	-	-	Ω
			4.5	-	100	200	-	250	
			6.0	-	60	170	-	210	
Difference of ON Resistance Between Any Two of Four Switches	ΔR _{ON}	V _C =V _{IHC} I _{I/O} =100μA	2.0	-	50	-	-	-	Ω
			4.5	-	3	-	-	-	
			6.0	-	2	-	-	-	

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DC ELECTRICAL CHARACTERISTICS (CONTINUED)

PARAMETER	SYMBOL	TEST CONDITION	V _{CC}	Ta=25°C			Ta=-40~85°C		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
Input/Output Leakage Current (Switch OFF)	I _{OFF}	V _C =V _{ILC} V _{I/O} =6V, V _O /I=0V or V _{I/O} =0V, V _O /I=6V	6.0	-	-	±0.1	-	±0.1	μA
Input Leakage Current	I _{IN}		6.0	-	-	±0.1	-	±1.0	
Quiescent Supply Current	I _{CC}	V _{IN} =V _{CC} or GND	6.0	-	-	1.0	-	10.0	

AC ELECTRICAL CHARACTERISTICS (C_L=50pF, Input t_r=t_f=6ns)

PARAMETER	SYMBOL	TEST CONDITION	Ta=25°C				Ta=-40~85°C		UNIT
			VCC	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time (Input to Output)	t _{pLH} t _{pHL}	R _L =10kΩ	2.0	-	13	50	-	60	ns
			4.5	-	5	10	-	12	
			6.0	-	4	8	-	10	
Output Enable Time	t _{pZH} t _{pZL}	R _L =1kΩ	2.0	-	27	115	-	140	
			4.5	-	14	23	-	28	
			6.0	-	12	20	-	24	
Output Disable Time	t _{pLZ} t _{pHZ}	R _L =1kΩ	2.0	-	45	115	-	140	
			4.5	-	16	23	-	28	
			6.0	-	14	20	-	24	
Sine Wave Distortion		V _{SS} =-2.5V V _{in} =0.88V _{RMS} R _L =10kΩ f=1kHz	2.5	-	0.05	-	-	-	%
Frequency Response (Switch ON) $\frac{V_{out}}{V_{in}} = -3dB$		V _{SS} =-2.5V V _{in} =0.88V _{RMS} R _L =1kΩ	2.5	-	30	-	-	-	MHz
Feedthrough Attenuation (Switch OFF) $\frac{V_{out}}{V_{in}} = -50dB$		V _{SS} =-2.5V V _{in} =0.88V _{RMS} R _L =1kΩ	2.5	-	1.0	-	-	-	
Crosstalk (Control Input to Signal Output)		R _{IN} =1kΩ R _L =10kΩ	2.0	-	25	-	-	-	mV
			4.5	-	60	-	-	-	
			6.0	-	75	-	-	-	

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

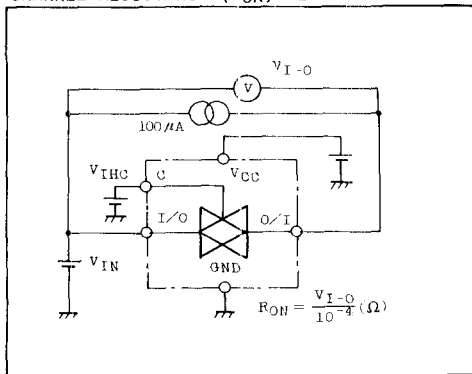
PARAMETER	SYMBOL	TEST CONDITION	$T_a=25^\circ\text{C}$			$T_a=-40\sim 85^\circ\text{C}$		UNIT
			V_{CC}	MIN.	TYP.	MAX.	MIN.	MAX.
Crosstalk (Between Any Two Switches)			2.5	-	1.5	-	-	-
Maximum Control Input Frequency			2.0	-	20	-	-	-
			4.5	-	30	-	-	-
			6.0	-	30	-	-	-
Control Input Capacitance	C_{IN}			-	5	10	-	10
Switch Input/Output Capacitance	$C_{I/O}$			-	6	-	-	-
Feedthrough Capacitance	C_{I-O}			-	0.5	-	-	-
Power Dissipation Capacitance	$C_{PD}(1)$			-	13	-	-	-

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).

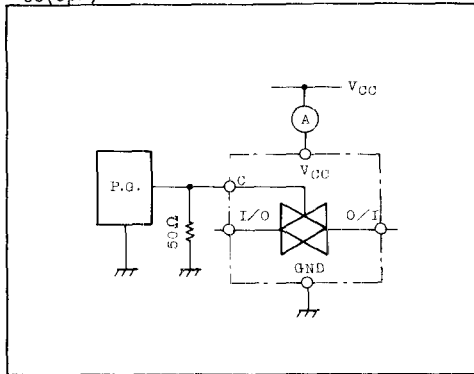
Average operating current can be obtained by the equation hereunder.

$$I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/4 \text{ (per CHANNEL)}$$

CHANNEL RESISTANCE (R_{ON}) TEST CIRCUIT

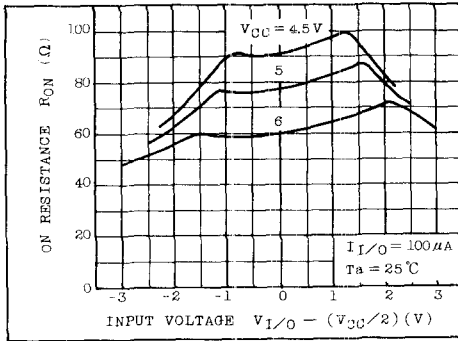


$I_{CC(opr)}$ TEST CIRCUIT

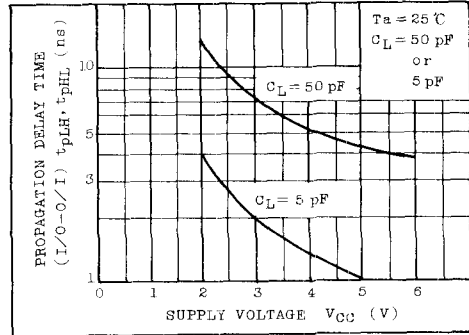


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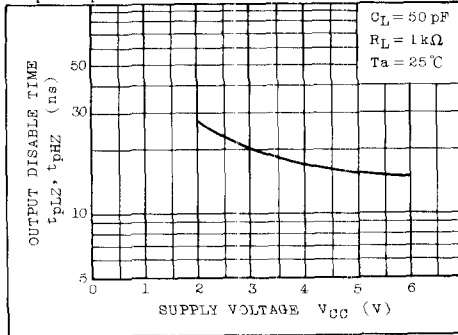
R_{ON}-V_{IN} CHARACTERISTICS (TYP.)



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



t_{PLZ}, t_{PHZ} - V_{CC} CHARACTERISTICS (TYP.)



t_{pZL}, t_{pZH} - V_{CC} CHARACTERISTICS (TYP.)

