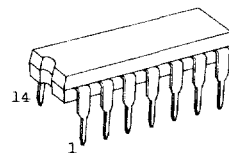


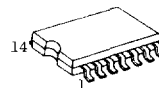
## TC4066BP/TC4066BF QUAD BILATERAL SWITCH

TC4066BP/BF contains four independent circuits of bidirectional switches. When control input CONT is set to "H" level, the impedance between input and output of the switch becomes low and when it is set to "L" level, the impedance becomes high. This can be applied for switching of analog signals and digital signals.

- ON-resistance,  $R_{ON}$ 
  - 250 $\Omega$  (TYP.) .....  $V_{DD}-V_{SS}=5V$
  - 110 $\Omega$  (TYP.) .....  $V_{DD}-V_{SS}=10V$
  - 70 $\Omega$  (TYP.) .....  $V_{DD}-V_{SS}=15V$
- OFF-resistance,  $R_{OFF}$ 
  - $R_{OFF}$  (TYP.) > 10<sup>9</sup> $\Omega$



DIP14 (3D14A-P)

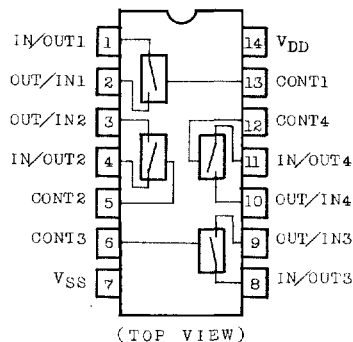


MFP14 (F14GB-P)

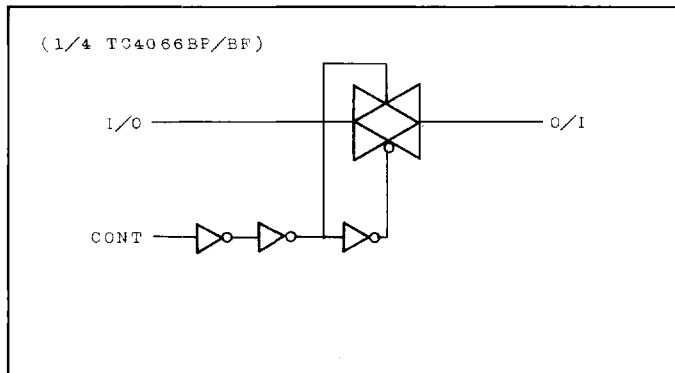
### ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNITS
DC Supply Voltage	$V_{DD}$	$V_{SS}-0.5 \sim V_{SS}+20$	V
Control Input Voltage	$V_C$ IN	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
Switch I/O Voltage	$V_{I/O}$	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
Power Dissipation	$P_D$	300(DIP)/180(MFP)	mW
Potential difference across I/O during ON	$V_I-V_O$	$\pm 0.5$	V
Control Input Current	$I_C$ IN	$\pm 10$	mA
Operating Temperature Range	$T_A$	-40 ~ 85	$^{\circ}C$
Storage Temperature Range	$T_{stg}$	-65 ~ 150	$^{\circ}C$
Lead Temp./Time	$T_{sol}$	260 $^{\circ}C \cdot 10$ sec	

### PIN ASSIGNMENT



### LOGIC DIAGRAM



### TRUTH TABLE

CONTROL	Impedance Between IN/OUT-OUT/IN *
H	$0.5 \sim 5 \times 10^2 \Omega$
L	$> 10^9 \Omega$

\* See Static Electrical Characteristics

# TC4066BP/BF

## RECOMMENDED OPERATING CONDITIONS (V<sub>SS</sub>=0V)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS
DC Supply Voltage	V <sub>DD</sub>	3	-	18	V
Input/Output Voltage	V <sub>DD</sub> /V <sub>OUT</sub>	0	-	V <sub>DD</sub>	

## STATIC ELECTRICAL CHARACTERISTICS (In case not specifically appointed, V<sub>SS</sub>=0V)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	V <sub>SS</sub> (V)	V <sub>DD</sub> (V)	-40°C		25°C			85°C		UNITS
					MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
Control Input High Voltage	V <sub>IH</sub>	I <sub>is</sub>  =10μA		5	3.5	-	3.5	2.75	-	3.5	-	V
				10	7.0	-	7.0	5.50	-	7.0	-	
				15	11.0	-	11.0	8.25	-	11.0	-	
Control Input Low Voltage	V <sub>IL</sub>	I <sub>is</sub>  =10μA		5	-	1.5	-	2.25	1.5	-	1.5	V
				10	-	3.0	-	4.5	3.0	-	3.0	
				15	-	4.0	-	6.75	4.0	-	4.0	
On-State Resistance	R <sub>ON</sub>	0 ≤ V <sub>is</sub> ≤ V <sub>DD</sub> R <sub>L</sub> =10kΩ		5	-	800	-	290	950	-	1200	Ω
				10	-	210	-	120	250	-	300	
				15	-	140	-	85	160	-	200	
ΔOn-State Resistance (Between Any 2 Switches)	R <sub>ON</sub> <sup>Δ</sup>			5	-	-	-	10	-	-	-	Ω
				10	-	-	-	6	-	-	-	
				15	-	-	-	4	-	-	-	
Input/Output Leakage Current	I <sub>OFF</sub>	V <sub>IN</sub> =18V, V <sub>OUT</sub> =0V V <sub>IN</sub> =0V, V <sub>OUT</sub> =18V		18	-	±100	-	±0.1	±100	-	±1000	nA
				18	-	±100	-	±0.1	±100	-	±1000	
Quiescent Device Current	I <sub>DD</sub>	V <sub>IN</sub> =V <sub>DD</sub> , V <sub>SS</sub> *		5	-	0.25	-	0.001	0.25	-	7.5	μA
				10	-	0.5	-	0.001	0.5	-	15	
				15	-	1.0	-	0.002	1.0	-	30	
Input Current	"H" Level	I <sub>IH</sub>	V <sub>IH</sub> =18V	18	-	0.1	-	10 <sup>-5</sup>	0.1	-	1.0	μA
	"L" Level	I <sub>IL</sub>	V <sub>IL</sub> =0V	18	-	-0.1	-	-10 <sup>-5</sup>	-0.1	-	-1.0	

\* All valid input combinations.

**DYNAMIC ELECTRICAL CHARACTERISTICS**

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	V <sub>SS</sub> (V) V <sub>DD</sub> (V)		MIN.	TYP.	MAX.	UNITS	
Propagation Delay Time (IN - OUT)	t <sub>pLH</sub>	C <sub>L</sub> =50pF	0	5	-	15	40	ns	
	t <sub>pHL</sub>		0	10	-	8	20		
			0	15	-	5	15		
Propagation Delay Time (CONTROL - OUT)	t <sub>pZL</sub>	R <sub>L</sub> =1kΩ	0	5	-	55	120		
	t <sub>pZH</sub>	C <sub>L</sub> =50pF	0	10	-	25	40		
			0	15	-	20	30		
Propagation Delay Time (CONTROL - OUT)	t <sub>pLZ</sub>	R <sub>L</sub> =1kΩ	0	5	-	45	80		
	t <sub>pHZ</sub>	C <sub>L</sub> =50pF	0	10	-	30	70		
			0	15	-	25	60		
Max. Control Input Repetition Rate	f <sub>MAX</sub> (C)	R <sub>L</sub> =1kΩ	0	5	-	10	-	MHz	
		C <sub>L</sub> =50pF	0	10	-	12	-		
			0	15	-	12	-		
-3dB Cutoff Frequency	f <sub>MAX</sub> (I-0)	R <sub>L</sub> =1kΩ C <sub>L</sub> =15pF (*1)	-5	5	-	30	-		
Total Harmonic Distortion	-	R <sub>L</sub> =10kΩ f=1kHz (*2)	-5	5	-	0.03	-		%
-50dB Feed through Frequency	-	R <sub>L</sub> =1kΩ (*3)	-5	5	-	600	-		kHz
-50dB Crosstalk Frequency	-	R <sub>L</sub> =1kΩ (*4)	-5	5	-	1	-		MHz
Crosstalk (CONTROL - OUT)	-	R <sub>IN</sub> =1kΩ	0	5	-	200	-		mV
		R <sub>OUT</sub> =10kΩ	0	10	-	400	-		
		C <sub>L</sub> =15pF	0	15	-	600	-		
Input Capacitance	C <sub>IN</sub>	Control Input	-	-	-	5	7.5	pF	
		Switch I/O	-	-	-	10	-		
Feed through Capacitance	C <sub>IN-OUT</sub>		-	-	-	0.5	-		

\*1 Sine wave of ±2.5V<sub>p-p</sub> shall be used for V<sub>IS</sub> and the frequency of  $20 \log_{10} \frac{V_{OS}}{V_{IS}} = -3\text{dB}$  shall be f<sub>MAX</sub>.

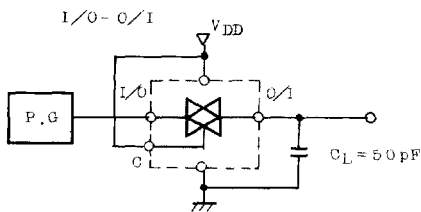
\*2 V<sub>IS</sub> shall be sine wave of ±2.5V<sub>p-p</sub>.

\*3 Sine wave of ±2.5V<sub>p-p</sub> shall be used for V<sub>IS</sub> and the frequency of  $20 \log_{10} \frac{V_{OUT}}{V_{IS}} = -50\text{dB}$  shall be feed-through.

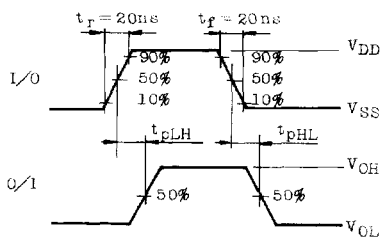
\*4 Sine wave of ±2.5V<sub>p-p</sub> shall be used for V<sub>IS</sub> and the frequency of  $20 \log_{10} \frac{V_{OUT}}{V_{IS}} = -50\text{dB}$  shall be crosstalk.

## CIRCUIT FOR MEASUREMENT OF ELECTRICAL CHARACTERISTICS

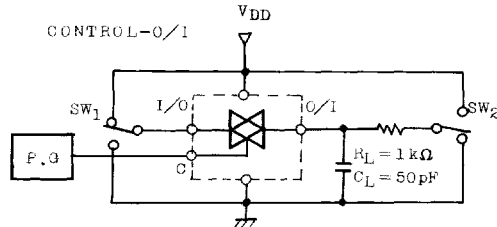
### 1. $t_{pLH}$ , $t_{pHL}$



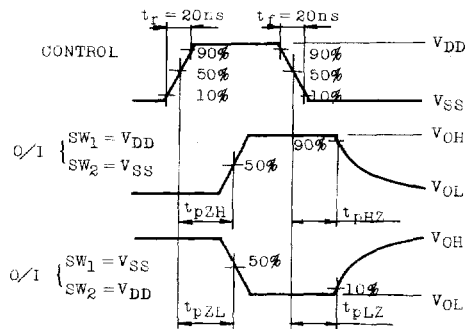
#### WAVEFORM



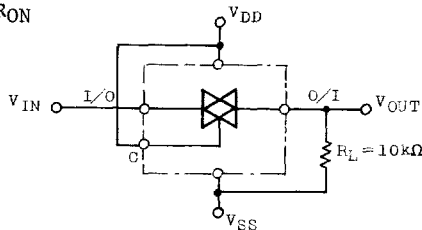
### 2. $t_{pZL}$ , $t_{pZH}$ , $t_{pLZ}$ , $t_{pHZ}$



#### WAVEFORM

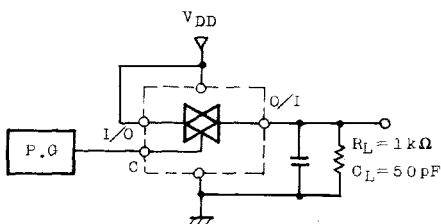


### 3. $R_{ON}$

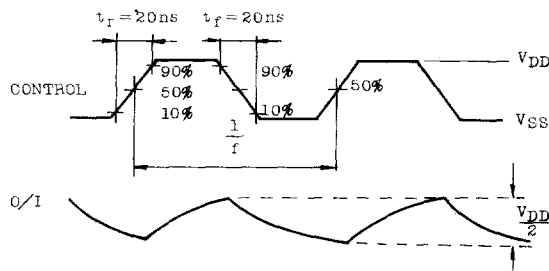


$$R_{ON} = 10 \times \frac{(V_{IN} - V_{OUT})}{V_{OUT}} \text{ (k}\Omega\text{)}$$

### 4. $f_{MAX}(C)$

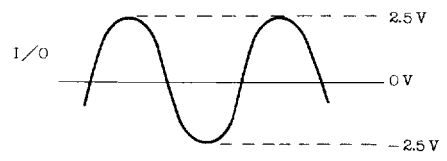
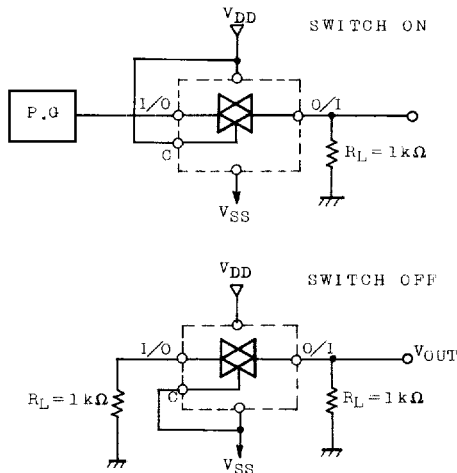


#### WAVEFORM

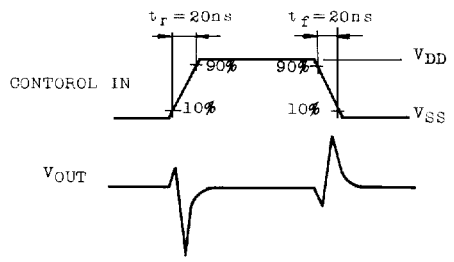
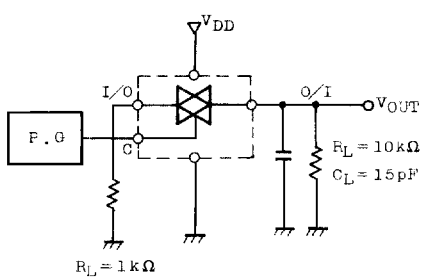


CIRCUIT FOR MEASUREMENT OF ELECTRICAL CHARACTERISTICS

5. CROSSTALK BETWEEN ANY TWO SWITCHES



6. CROSSTALK, CONTROL TO INPUT



7. TOTAL HARMONIC DISTORTION,  $f_{MAX}(I-O)$ , FEEDTHROUGH

