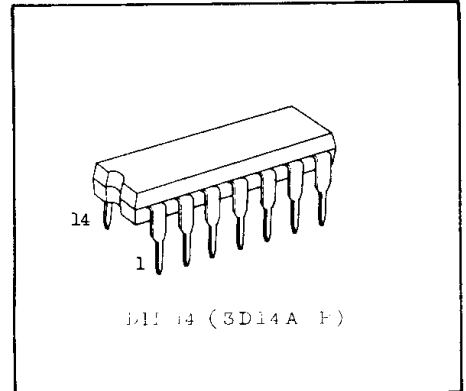


TC5024BP QUAD BUS BUFFER WITH 3-STATE OUTPUT ("H"-DISABLE)  
TC5025BP QUAD BUS BUFFER WITH 3-STATE OUTPUT ("L"-DISABLE)

TC5024BP/TC5025BP contain four circuits of buffers having tri-state outputs. As all the buffers are controlled by four independent DISABLE inputs, any buffer outputs can be placed in the high impedance state.

The output becomes high impedance with DIS="H" for TC5024BP and  $\overline{\text{DIS}}=\text{"L"}$  for TC5025BP.

Large output current enables to directly drive one TTL. These can be utilized as interfaces with system bus lines, multiplexers, etc.

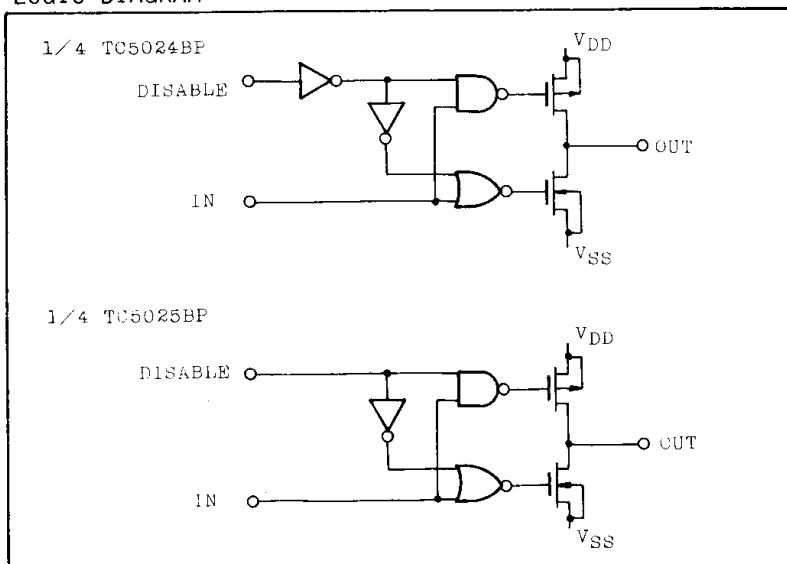


DIP 14 (3Di4A P)

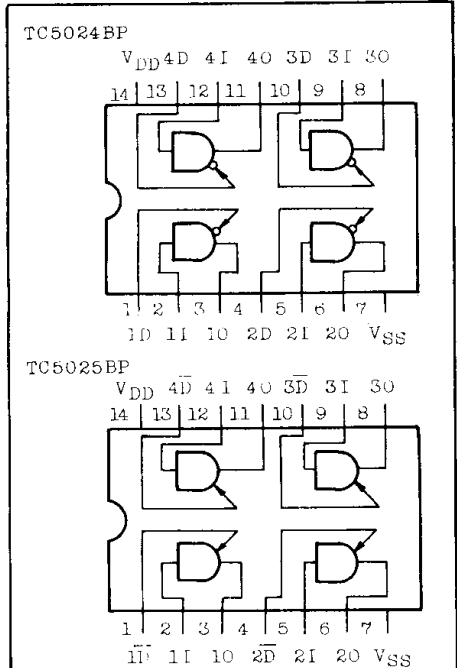
### ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V <sub>DD</sub>	V <sub>SS</sub> -0.5 ~ V <sub>SS</sub> +20	V
Input Voltage	V <sub>IN</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
Output Voltage	V <sub>OUT</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
DC Input Current	I <sub>IN</sub>	±10	mA
Power Dissipation	P <sub>D</sub>	300	mW
Storage Temperature Range	T <sub>stg</sub>	-65 ~ 150	°C
Lead Temp./Time	T <sub>sol</sub>	260°C · 10sec	

### LOGIC DIAGRAM



### PIN ASSIGNMENT



### TRUTH TABLE

TC5024BP			TC5025BP		
IN	DIS	OUT	IN	DIS	OUT
L	L	L	L	L	HZ
H	L	H	H	L	HZ
L	H	HZ	L	H	L
H	H	HZ	H	H	H

HZ ; HIGH IMPEDANCE

# TC5024BP, TC5025BP

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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>DD</sub>	3	-	18	V
Input Voltage	V <sub>IN</sub>	0	-	V <sub>DD</sub>	V
Operating Temp.	T <sub>opr</sub>	-40	-	85	°C

## ELECTRICAL CHARACTERISTICS (V<sub>SS</sub>=0V)

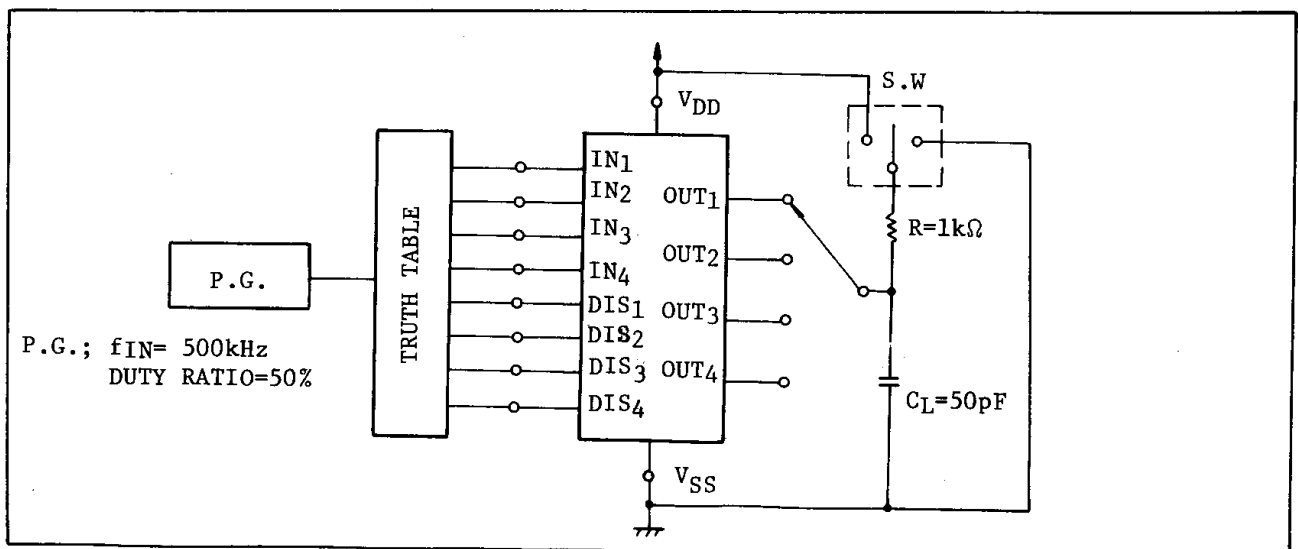
CHARACTERISTIC	SYMBOL	TEST CONDITIONS	V <sub>DD</sub> (V)	-40°C		25°C			85°C		UNIT	
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.		
High Level Output Voltage	V <sub>OH</sub>	I <sub>OUT</sub>   < 1μA V <sub>IN</sub> = V <sub>SS</sub> , V <sub>DD</sub>	5	4.95	-	4.95	5.00	-	4.95	-	V	
			10	9.95	-	9.95	10.00	-	9.95	-		
			15	14.95	-	14.95	15.00	-	14.95	-		
Low Level Output Voltage	V <sub>OL</sub>	I <sub>OUT</sub>   < 1μA V <sub>IN</sub> = V <sub>SS</sub> , V <sub>DD</sub>	5	-	0.05	-	0.00	0.05	-	0.05	V	
			10	-	0.05	-	0.00	0.05	-	0.05		
			15	-	0.05	-	0.00	0.05	-	0.05		
High Level Output Current	I <sub>OH</sub>	V <sub>OH</sub> = 2.5V V <sub>OH</sub> = 9.5V V <sub>OH</sub> = 13.5V V <sub>IN</sub> = V <sub>SS</sub> , V <sub>DD</sub>	5	-1.40	-	-1.25	-	-	-1.0	-	mA	
			10	-1.40	-	-1.25	-	-	-1.0	-		
			15	-4.00	-	-3.75	-	-	-3.0	-		
Low Level Output Current	I <sub>OL</sub>	V <sub>OL</sub> = 0.4V V <sub>OL</sub> = 0.5V V <sub>OL</sub> = 1.5V V <sub>IN</sub> = V <sub>SS</sub> , V <sub>DD</sub>	5	3.5	-	3.2	-	-	2.5	-	mA	
			10	6.0	-	5.0	-	-	3.6	-		
			15	26.0	-	24.0	-	-	18.0	-		
High Level Input Voltage (IN, TC5024BP DISABLE)	V <sub>IH</sub>	V <sub>OUT</sub> =0.5V, 4.5V V <sub>OUT</sub> =1.0V, 9.0V V <sub>OUT</sub> =1.5V, 13.5V  I <sub>OUT</sub>   < 1μA	5	3.5	-	3.5	2.75	-	3.5	-	V	
			10	7.0	-	7.0	5.5	-	7.0	-		
			15	11.0	-	11.0	8.25	-	11.0	-		
Low Level Input Voltage (IN, TC5024BP DISABLE)	V <sub>IL</sub>	V <sub>OUT</sub> =0.5V, 4.5V V <sub>OUT</sub> =1.0V, 9.0V V <sub>OUT</sub> =1.5V, 13.5V  I <sub>OUT</sub>   < 1μA	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		
High Level Input Voltage (TC5025BP DISABLE)	V <sub>IH</sub>	V <sub>OUT</sub> =0.5V, 4.5V V <sub>OUT</sub> =1.0V, 9.0V V <sub>OUT</sub> =1.5V, 13.5V  I <sub>OUT</sub>   < 1μA	5	4.0	-	4.0	-	-	4.0	-	V	
			10	8.0	-	8.0	-	-	8.0	-		
			15	12.5	-	12.5	-	-	12.5	-		
Low Level Input Voltage (TC5025BP DISABLE)	V <sub>IL</sub>	V <sub>OUT</sub> =0.5V, 4.5V V <sub>OUT</sub> =1.0V, 9.0V V <sub>OUT</sub> =1.5V, 13.5V  I <sub>OUT</sub>   < 1μA	5	-	1.0	-	-	1.0	-	1.0	V	
			10	-	2.0	-	-	2.0	-	2.0		
			15	-	2.5	-	-	2.5	-	2.5		
Input Current	H Level	I <sub>IH</sub>	V <sub>IH</sub> = 18V	18	-	0.3	-	10 <sup>-5</sup>	0.3	-	1.0	μA
	L Level	I <sub>IL</sub>	V <sub>IL</sub> = 0V	18	-	-0.3	-	-10 <sup>-5</sup>	-0.3	-	-1.0	
Disable Current	H Level	I <sub>DH</sub>	V <sub>OH</sub> = 18V	18	-	0.5	-	10 <sup>-4</sup>	0.5	-	30	μA
	L Level	I <sub>DL</sub>	V <sub>OL</sub> = 0V	18	-	-0.5	-	-10 <sup>-4</sup>	-0.5	-	-30	
Quiescent Current Consumption	I <sub>DD</sub>	V <sub>IN</sub> = V <sub>SS</sub> , V <sub>DD</sub> *	5	-	4.0	-	0.002	4.0	-	30	μA	
			10	-	8.0	-	0.004	8.0	-	60		
			15	-	16.0	-	0.008	16.0	-	120		

\* All valid input combinations

## SWITCHING CHARACTERISTICS (Ta=25°C, VSS=0V, CL=50pF)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	VDD (V)	TC5024BP			TC5025BP			UNIT
				MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Output Rise Time	t <sub>TLH</sub>		5	-	130	400	-	130	400	ns
			10	-	65	200	-	65	200	
			15	-	50	160	-	50	160	
Output Fall Time	t <sub>THL</sub>		5	-	100	200	-	100	200	ns
			10	-	50	100	-	50	100	
			15	-	40	80	-	40	80	
(LOW-HIGH) Propagation Delay Time ( IN - OUT )	t <sub>pLH</sub>		5	-	150	300	-	150	300	ns
			10	-	75	150	-	75	150	
			15	-	60	100	-	60	100	
(HIGH-LOW) Propagation Delay Time ( IN - OUT )	t <sub>pHL</sub>		5	-	180	300	-	180	300	ns
			10	-	75	150	-	75	150	
			15	-	60	100	-	60	100	
Three State Propagation Delay Time	H-HZ	t <sub>pHZ</sub>	5	-	95	200	-	70	150	ns
			10	-	50	120	-	50	100	
			15	-	40	100	-	40	80	
	L-HZ	t <sub>pLZ</sub>	5	-	300	600	-	130	200	ns
			10	-	200	400	-	70	150	
			15	-	190	300	-	60	120	
	HZ-H	t <sub>pZH</sub>	5	-	100	200	-	70	150	ns
			10	-	40	120	-	40	80	
HZ-L	t <sub>pZL</sub>	5	-	210	600	-	130	200	ns	
		10	-	90	300	-	60	150		
			15	-	60	200	-	40	120	
Input Capacity	C <sub>IN</sub>			-	5	7.5	-	5	7.5	pF
Output Disable Capacity	C <sub>OUT</sub>			-	30	-	-	30	-	pF

### SWITCHING TIME TEST CIRCUIT



# TC5024BP, TC5025BP

## SWITCHING TIME TEST WAVEFORMS

