

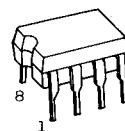
TC40107BP DUAL 2-INPUT NAND BUFFER/DRIVER

TC40107BP is a dual 2-input NAND gate, of which output is of open-drain structure by use of N-channel MOS FET. Being capable of driving a large current, it can be directly connected to a relay, a lamp, a light-emitting diode (LED), etc. Wired OR can be also made.

($I_{OL}=74\text{mA(Typ.)}$ at $V_{DD}=10\text{V}$ and $V_{OL}=0.5\text{V}$)

The package is a compact DIP 8-pin unit, which is easily mounted.

Since its output current is large, if the capacitor of an output line exceeds 500pF, a resistor of 25 Ω or more should be used in series with the capacitor.

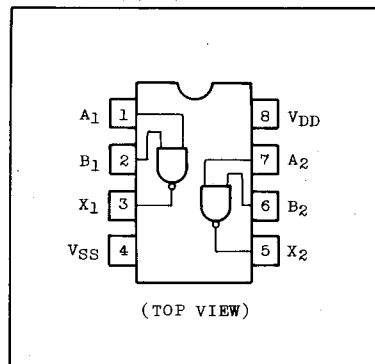


DIP 8 (3D8A-P)

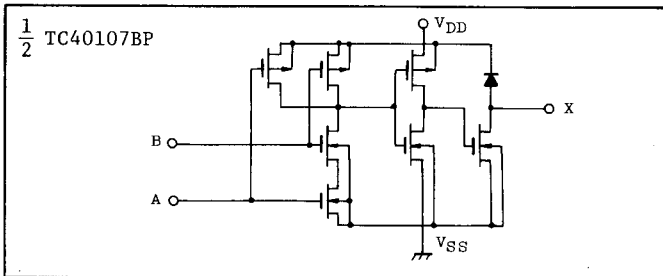
MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V_{DD}	$V_{SS}-0.5 \sim V_{SS}+20$	V
Input Voltage	V_{IN}	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
Output Voltage	V_{OUT}	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
DC Input Current	I_{IN}	± 10	mA
Max. GND Current	I_{SS}	125	mA
Power Dissipation	P_D	300	mW
Operating Temperature Range	T_A	$-40 \sim 85$	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	$-65 \sim 150$	$^{\circ}\text{C}$
Lead Temp./Time	T_{sol}	$260^{\circ}\text{C} \cdot 10 \text{ sec}$	

PIN ASSIGNMENT



CIRCUIT DIAGRAM



TRUTH TABLE

INPUT		OUTPUT
A	B	X
L	L	HZ
L	H	HZ
H	L	HZ
H	H	L

HZ : High impedance

RECOMMENDED OPERATING CONDITIONS ($V_{SS}=0\text{V}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	V_{DD}	3	-	18	V
Input Voltage	V_{IN}	0	-	V_{DD}	V
Load Capacitance	C_L	-	-	500	pF

STATIC ELECTRICAL CHARACTERISTICS (V_{SS}=0V)

CHARACTERISTIC	SYM-BOL	TEST CONDITION	V _{DD} (V)	-40°C		25°C			85°C		UNIT	
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.		
Low-Level Output Voltage	V _{OL}	I _{OUT} < 1μA V _{IH} =V _{DD}	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		
Output Low Current	I _{OL}	V _{OL} =0.4V	5	20	-	16	32	-	14	-	mA	
		V _{OL} =1.0V	5	42	-	34	68	-	30	-		
		V _{OL} =0.5V	10	46	-	37	74	-	32	-		
		V _{OL} =1.0V	10	85	-	68	136	-	60	-		
		V _{OL} =0.5V	15	63	-	50	100	-	44	-		
		V _{IH} =V _{DD}										
Input High Voltage	V _{IH} *	V _{OUT} =0.5V, 4.5V	5	3.5	-	3.5	2.75	-	3.5	-	V	
		V _{OUT} =1.0V, 9.0V	10	7.0	-	7.0	5.5	-	7.0	-		
		V _{OUT} =1.5V, 13.5V	15	11.0	-	11.0	8.25	-	11.0	-		
		I _{OUT} < 1μA										
Input Low Voltage	V _{IL} *	V _{OUT} =4.5V	5	-	1.5	-	2.25	1.5	-	1.5	V	
		V _{OUT} =9.0V	10	-	3.0	-	4.5	3.0	-	3.0		
		V _{OUT} =13.5V	15	-	4.0	-	6.75	4.0	-	4.0		
		I _{OUT} < 1μA										
Input Current	"H" Level	I _{IH}	V _{IH} =18V	18	-	0.1	-	10 ⁻⁵	0.1	-	1.0	μA
	"L" Level	I _{IL}	V _{IL} =0V	18	-	-0.1	-	-10 ⁻⁵	-0.1	-	-1.0	
3-State Output Leakage Current	I _{DH}	V _{OH} =18V	18	-	2	-	10 ⁻⁴	2	-	20	μA	
Quiescent Device Current	I _{DD} **	V _{IN} =V _{DD} , V _{SS} Outputs Open	5	-	1	-	0.001	1	-	7.5	μA	
			10	-	2	-	0.001	2	-	15		
			15	-	4	-	0.002	4	-	30		

* Required external pull-up register R (=20kΩ)

** All valid input combinations.

DYNAMIC ELECTRICAL CHARACTERISTICS (Ta=25°C, VSS=0V, CL=50pF)

CHARACTERISTIC	SYMBOL	TEST CONDITION	VDD(V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	t _{TLH}	R _L =120Ω	5	-	35	100	ns
			10	-	25	70	
			15	-	20	50	
Output Transition Time (High to Low)	t _{THL}	R _L =120Ω	5	-	35	100	ns
			10	-	10	40	
			15	-	7	20	
Propagation Delay Time (Low to High)	t _{pLH}	R _L =120Ω	5	-	60	200	ns
			10	-	35	120	
			15	-	30	100	
Propagation Delay Time (High to Low)	t _{pHL}	R _L =120Ω	5	-	70	200	ns
			10	-	30	90	
			15	-	20	60	
Input Capacitance	C _{IN}			-	5	7.5	pF
Output Capacitance	C _{OUT}			-	30	-	pF

CIRCUIT AND WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

