TC74HC240AP/AF/AFW
TC74HC241AP/AF
TC74HC244AP/AF/AFW

Octal Bus Buffer
TC74HC240 Inverted, 3-State Outputs
TC74HC241 Non-Inverted, 3-State Outputs
TC74HC244 Non-Inverted, 3-State Outputs

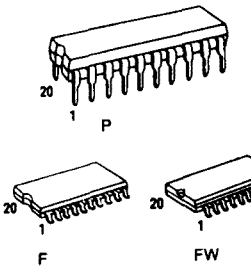
The TC74HC240A, 241A and 244A are high speed CMOS OCTAL BUS BUFFERs fabricated with silicon gate C^2MOS technology.

They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

The 74HC240A is an inverting 3-state buffer having two active-low output enables. The TC74HC241A and TC74HC244A are non-inverting 3-state buffers that differ only in that the 241A has one active-high and one active-low output enable, and the 244A has two active-low output enables.

These devices are designed to be used with 3-state memory address drivers, etc.

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



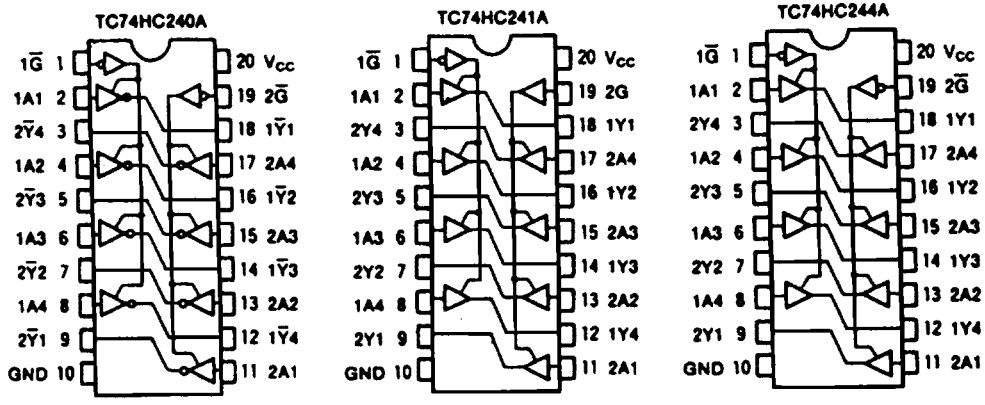
Truth Table

Inputs			Outputs	
$\overline{G}$	G^{Δ}	A_n	Y_n	$Y_n^{\Delta\Delta}$
L	H	L	L	H
L	H	H	H	L
H	L	X	Z	Z

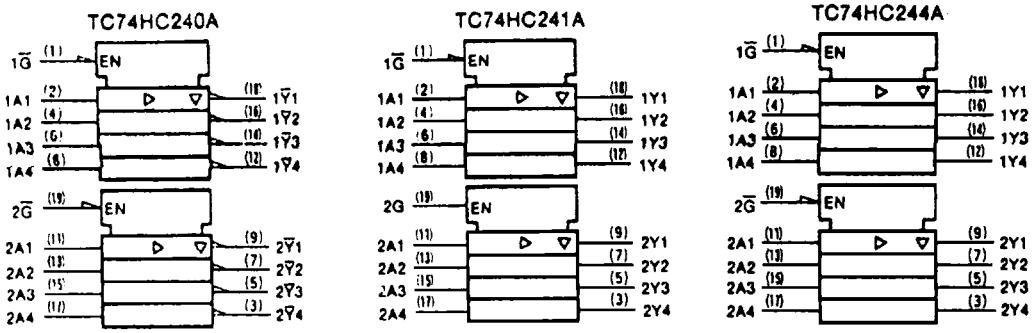
Δ for TC74HC241A, 244A
ΔΔ: for TC74HC240A only
X: Don't Care
Z: High Impedance

Features

- High Speed: t_{pd} = 10ns(Typ.) at V_{CC} = 5V
- Low Power Dissipation: I_{CC} = 4μA(Max.) at Ta = 25°C
- High Noise Immunity: $V_{NIH} = V_{NIL}$ = 28% V_{CC} (Min)
- Output Drive Capability: 15 LSTTL Loads
- Symmetrical Output Impedance: $|I_{OH}| = I_{OL}$ = 6mA(Min.)
- Balanced Propagation Delays: $t_{pLH} = t_{pHL}$
- Wide Operating Voltage Range: V_{CC}(opr) = 2V ~ 6V
- Pin and Function Compatible with 74LS240/241/244



Pin Assignment (Top View)



IEC Logic Symbol

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}	±35	mA
DC V_{CC}/Ground Current	I_{CC}	±75	mA
Power Dissipation	P_D	500(DIP)*/180(MFP)	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. From Ta = 65°C to 85°C a derating factor of -10mW/°C shall be applied until 300mW.

Recommended Operating Conditions

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	4.5 ~ 5.5	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) 0 ~ 500(V_{CC} = 4.5V) 0 ~ 400(V_{CC} = 6.0V)	ns

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 4.5 6.0	1.5 3.15 4.2	– – –	– – –	1.5 3.15 4.2	– – –	V
Low-Level Input Voltage	V_{IL}	–		2.0 4.5 6.0	– – –	– – –	0.5 1.35 1.8	- - -	0.5 1.35 1.8	V
High-Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = -20μA	2.0 4.5 6.0	1.9 4.4 5.9	2.0 4.5 6.0	– – –	1.9 4.4 5.9	– – –	V
			I_{OH} = -6 mA I_{OH} = -7.8mA	4.5 6.0	4.18 5.68	4.31 5.80	– –	4.13 5.63	– –	
Low-Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20μA	2.0 4.5 6.0	– – –	0.0 0.0 0.0	0.1 0.1 0.1	– – –	0.1 0.1 0.1	V
			I_{OL} = 6 mA I_{OL} = 7.8mA	4.5 6.0	– –	0.17 0.18	0.26 0.26	– –	0.33 0.33	
3-State Output Off-State Current	I_{OZ}	V_{IN} = V_{IH} or V_{IL} V_{OUT} = V_{CC} or GND		6.0	–	–	±0.5	–	±5.0	μA
Input Leakage Current	I_{IN}	V_{IN} = V_{CC} or GND		6.0	–	–	±0.1	–	±1.0	
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		6.0	–	–	4.0	–	40.0	

AC Electrical Characteristics (C_L = 50pF, Input $t_r = t_f$ = 6ns)

Parameter	Symbol	Test Condition	CL	V_{CC}	Ta = 25°C Min.	Ta = 25°C Typ.	Ta = 25°C Max.	Ta = -40 ~ 85°C Min.	Ta = -40 ~ 85°C Max.	Unit
Output Transition Time	t_{TLH} t_{THL}	–	50	2.0	–	25	60	–	75	ns
				4.5	–	7	12	–	15	
				6.0	–	6	10	–	13	
Propagation Delay Time	t_{pLH} t_{pHL}	–	50	2.0	–	36	90	–	115	
				4.5	–	12	18	–	23	
				6.0	–	10	15	–	20	
			150	2.0	–	51	130	–	165	
				4.5	–	17	26	–	33	
				6.0	–	14	22	–	28	
Output Enable Time	t_{pZL} t_{pZH}	R_L = 1k Ω	50	2.0	–	48	125	–	155	
				4.5	–	16	25	–	31	
				6.0	–	14	21	–	26	
			150	2.0	–	63	165	–	205	
				4.5	–	21	33	–	41	
				6.0	–	18	28	–	35	
Output Disable Time	t_{pLZ} t_{pHZ}	R_L = 1k Ω	50	2.0	–	32	125	–	155	
				4.5	–	15	25	–	31	
				6.0	–	14	21	–	26	
Input Capacitance	C_{IN}	–			–	5	10	–	10	pF
Output Capacitance	C_{OUT}	–			–	10	–	–	–	
Power Dissipation Capacitance	C_{PD}(1)	TC74HC240A			–	31	–	–	–	
		TC74HC241A/244A			–	33	–	–	–	

Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation:

$I_{CC(opr)} = C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}/8$(per bit)