

TC74HC7240AP/AF TC74HC7241AP/AF TC74HC7244AP/AF

Octal Bus Buffer

TC74HC7240 Inverted, 3-State Outputs

TC74HC7241 Non-Inverted, 3-State Outputs

TC74HC7244 Non-Inverted, 3-State Outputs

The TC74HC7240A, 241A AND 244A are high speed CMOS OCTAL BUS BUFFERs fabricated with silicon gate C²MOS technology.

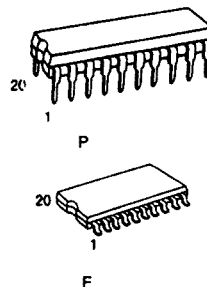
They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

The TC74HC7240A/7241A/7244A have same pin configuration and function as the TC74HC7240A/241A/244A.

And they have a hysteresis characteristics with each input, so TC74HC7240A/7241A/7244A can be used as a line receiver, etc.

The 74HC7240A is an inverting 3-state buffer having two active low output enables. The TC74HC7241A and HC7244A are non-inverting 3-state buffers that differ only in that the 7241A has one active-high and one active-low output enable, and the HC7244A has two active-low output enables.

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



Truth Table

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

Δ : for TC74HC7241A, 244A

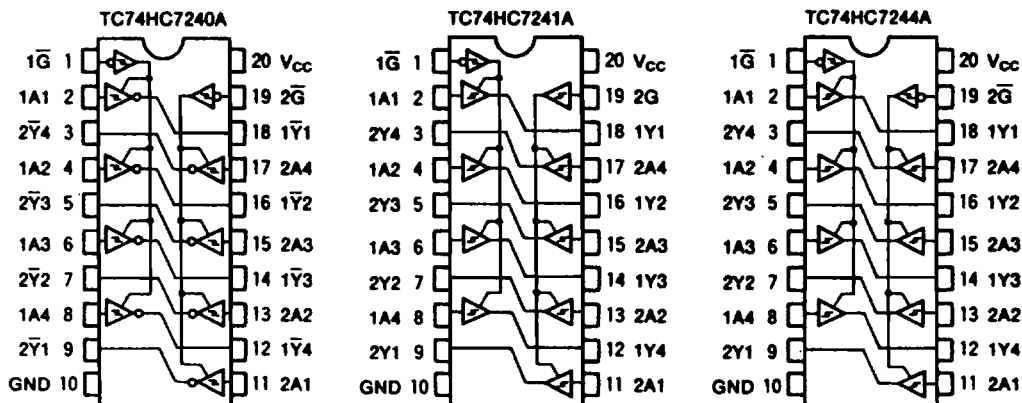
$\Delta\Delta$: for TC74HC7240A only

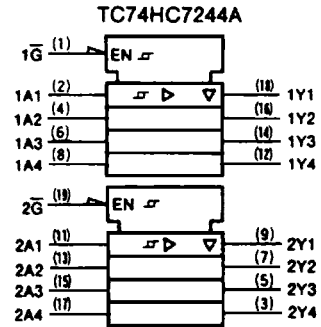
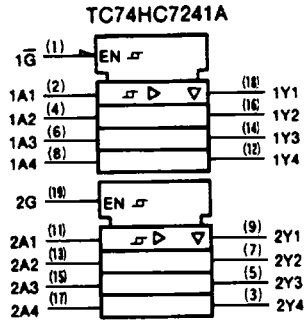
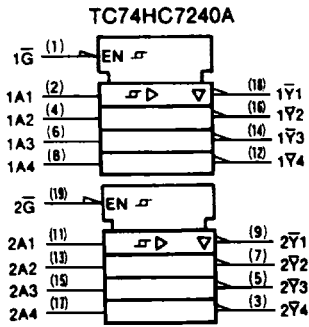
X: Don't Care

Z: High Impedance

Features

- High Speed: $t_{pd} = 15\text{ns}$ (Typ.) at $V_{CC} = 5\text{V}$
- Low Power Dissipation: $I_{CC} = 4\mu\text{A}$ (Max.) at $T_a = 25^\circ\text{C}$
- High Noise Immunity: $V_{NIH} = 1.1\text{V}$ (Typ.) at $V_{CC} = 5\text{V}$
- Output Drive Capability: 15 LSTTL Loads
- Symmetrical Output Impedance: $|I_{OH}| = I_{OL} = 6\text{mA}$ (Min.)
- Balanced Propagation Delays: $t_{pLH} = t_{pHL}$
- Wide Operating Voltage Range: $V_{CC}(\text{opr}) = 2\text{V} \sim 6\text{V}$
- Pin and Function Compatible with 74LS240/241/244





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}	±25	mA
DC V_{CC} /Ground Current	I_{CC}	±50	mA
Power Dissipation	P_D	500(DIP)*/180(SOIC)	mW
Storage Temperature	T_{stg}	-65 - 150	°C
Lead Temperature 10sec	T_L	300	°C

*500mW in the range of $T_a = -40^{\circ}\text{C} \sim 65^{\circ}\text{C}$. From $T_a = 65^{\circ}\text{C}$ 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}	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

DC Electrical Characteristics

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.		
Positive Threshold Voltage	V_P	-	2.0	1.0	1.25	1.5	1.0	1.5	V	
			4.5	2.3	2.7	3.15	2.3	3.15		
			6.0	3.5	3.5	4.2	3.0	4.2		
Negative Threshold Voltage	V_N	-	2.0	0.3	0.65	0.9	0.3	0.9	V	
			4.5	1.13	1.6	2.0	1.13	2.0		
			6.0	1.5	2.3	2.6	1.5	2.6		
Hysteresis Voltage	V_H	-	2.0	0.3	0.6	1.0	0.3	1.0	V	
			4.5	0.6	1.1	1.4	0.6	1.4		
			6.0	0.8	1.2	1.7	0.8	1.7		
High-Level Output Voltage	V_{OH}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -20\mu\text{A}$	2.0	1.9	2.0	-	1.9	-	V
				4.5	4.4	4.5	-	4.4	-	
				6.0	5.9	6.0	-	5.9	-	
				4.5	4.18	4.31	-	4.13	-	
Low-Level Output Voltage	V_{OL}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = 7.8\text{ mA}$	2.0	-	0.0	0.1	-	0.1	V
				4.5	-	0.0	0.1	-	0.1	
				6.0	-	0.0	0.1	-	0.1	
				4.5	-	0.17	0.26	-	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	-	±0.5	μA	
			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			Ta = 25°C			Ta = -40 ~ 85°C		Unit
			CL	V _{CC}	Min.	Typ.	Max.	Min.	Max.	
Output Transition Time	t _{FLH} 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	-	50	125	-	155	
				4.5	-	15	25	-	31	
				6.0	-	13	21	-	26	
			150	2.0	-	67	165	-	205	
				4.5	-	20	33	-	41	
				6.0	-	17	28	-	35	
Output Enable Time	t _{pZL} t _{pZH}	R _L = 1k Ω	50	2.0	-	88	150	-	190	
				4.5	-	21	30	-	38	
				6.0	-	16	26	-	32	
			150	2.0	-	84	165	-	230	
				4.5	-	26	37	-	46	
				6.0	-	20	31	-	39	
Output Disable Time	t _{pLZ} t _{pHZ}	R _L = 1k Ω	50	2.0	-	48	150	-	190	
				4.5	-	21	30	-	38	
				6.0	-	19	26	-	32	
Input Capacitance	C _{IN}	-			-	5	10	-	pF	
Output Capacitance	C _{OUT}	-			-	10	-	-		
Power Dissipation Capacitance	C _{PD(1)}	TC74HC7240A		-	33	-	-	-		
		TC74HC7241A/7244A		-	34	-	-	-		

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:

$$I_{CC(oper)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/8(\text{per bit})$$