TC74AC240,241,244
Octal Bus Buffers

240: Inverted, 3-State Outputs
241: Non-Inverted, 3-State Outputs
244: Non-Inverted, 3-State Outputs

Features:

- **High Speed:** t_{pd} = 4.0ns (typ.) at V_{CC} = 5V
- **Low Power Dissipation:** I_{CC} = 8μA (max.) at Ta = 25°C
- **High Noise Immunity:** $V_{NIH} = V_{NIL}$ = 28% V_{CC} (min.)
- **Symmetrical Output Impedance:** $|I_{OH}| = I_{OL}$ = 24mA (min.). Capability of driving 50Ω transmission lines.
- **Balanced Propagation Delays:** $t_{pLH} = t_{pHL}$
- **Wide Operating Voltage Range:** V_{CC}(opr) = 2V~5.5V
- **Pin and Function Compatible with 74F240/241/244**
- **AC240 and AC244 Available in DIP, SOIC, SOP and SSOP Packages.**
- **AC241 Available in DIP, SOIC and SOP Packages.**

The TC74AC240, 241 and 244 are advanced high speed CMOS OCTAL BUS BUFFERS fabricated with silicon gate and double-layer metal wiring C²MOS technology.

They achieve the high speed operation similar to equivalent Bipolar Schottky TTL, while maintaining the CMOS low power dissipation.

The 74AC240 is an inverting 3-state buffer having two active-low output enables. The TC74AC241 and TC74AC244 are non-inverting 3-state buffers that differ only in that the 241 has one active-high and one active-low output enable, and the 244 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.

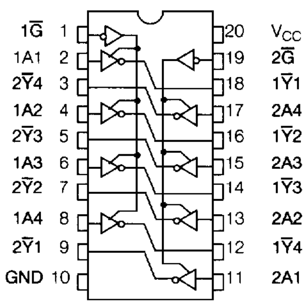
Truth Table

INPUTS			OUTPUTS	
$\overline{G}$	G^{Δ}	A_n	Y_n	$\overline{Y}n^{\Delta\Delta}$
L	H	L	L	H
L	H	H	H	L
H	L	X	Z	Z

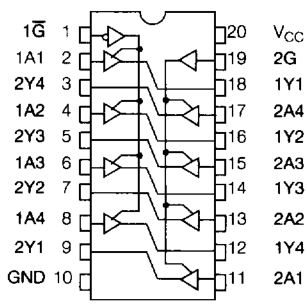
Δ : for TC74AC241 only
ΔΔ : for TC74AC240 only
X : Don't Care
Z : High Impedance

Pin Assignment

TC74AC240



TC74AC241



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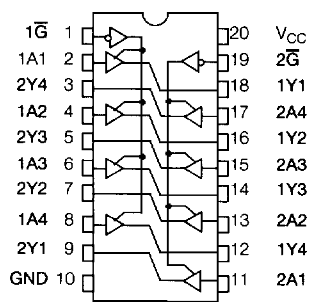


Absolute Maximum Ratings

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	-0.5~7.0	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}	±50	mA
DC Output Current	I_{OUT}	±50	mA
DC V_{CC}/Ground Current	I_{CC}	±200	mA
Power Dissipation	P_D	500 (DIP) */180 (SOP)	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 should be applied up to 300mW.

Recommended Operating Conditions

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	2.0~5.5	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	dt/dv	0~100 (V_{CC} = 3.3 ± 0.3V) 0~20 (V_{CC} = 5 ± 0.5V)	ns/v

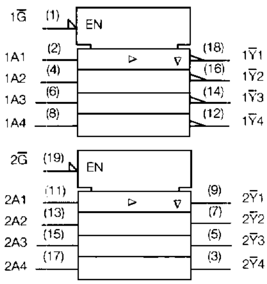
DC Electrical Characteristics

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	1.50	—	—	1.50	—	V
				3.0	2.10	—	—	2.10	—	
				5.5	3.85	—	—	3.85	—	
Low-Level Input Voltage	V_{IL}	—		2.0	—	—	0.50	—	0.50	V
				3.0	—	—	0.90	—	0.90	
				5.5	—	—	1.65	—	1.65	
High-Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = -50μA	2.0	1.9	2.0	—	1.9	—	V
				3.0	2.9	3.0	—	2.9	—	
				4.5	4.4	4.5	—	4.4	—	
			I_{OH} = -4mA	3.0	2.58	—	—	2.48	—	
			I_{OH} = -24mA	4.5	3.94	—	—	3.80	—	
			I_{OH} = -75mA*	5.5	—	—	—	3.85	—	
Low-Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 50μA	2.0	—	0.0	0.1	—	0.1	V
				3.0	—	0.0	0.1	—	0.1	
				4.5	—	0.0	0.1	—	0.1	
			I_{OL} = 12mA	3.0	—	—	0.36	—	0.44	
			I_{OL} = 24mA	4.5	—	—	0.36	—	0.44	
			I_{OL} = 75mA*	5.5	—	—	—	—	1.65	
3-State Output Off-State Current	I_{OZ}	V_{IN}=V_{IH} or V_{IL} V_{OUT}=V_{CC} or GND		5.5	—	—	±0.5	—	±5.0	μA
				5.5	—	—	±0.5	—	±5.0	
Input Leakage Current	I_{IN}	V_{IN} = V_{CC} or GND		5.5	—	—	±0.1	—	±1.0	
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		5.5	—	—	8.0	—	80.0	

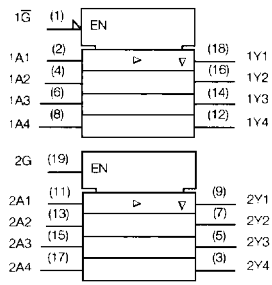
* This spec indicates the capability of driving 50Ω transmission lines.
One output should be tested at a time for a 10ms maximum duration.

IEC Logic Symbol

TC74AC240



TC74AC241



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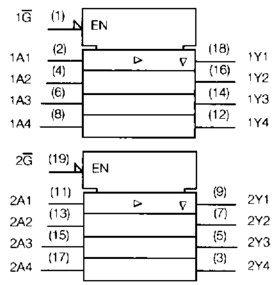

AC Electrical Characteristics (C_L = 50pF, R_L = 500Ω, Input t_r = t_f = 3ns)

PARAMETER	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = -40~85°C		UNIT
			V_{CC}	Min.	Typ.	Max.	Min.	Max.	
Propagation Delay Time *(2)	t_{pLH} t_{pHL}	—	3.3±0.3	—	6.3	10.5	1.0	12.0	ns
			5.0±0.5	—	4.8	7.0	1.0	8.0	
Propagation Delay Time * *(2)	t_{pLH} t_{pHL}	—	3.3±0.3	—	7.0	11.4	1.0	13.0	
			5.0±0.5	—	5.2	7.5	1.0	8.5	
Output Enable Time	t_{pZL} t_{pZH}	—	3.3±0.3	—	8.4	14.0	1.0	16.0	
			5.0±0.5	—	5.9	8.7	1.0	10.0	
Output Disable Time	t_{pLZ} t_{pHZ}	—	3.3±0.3	—	6.4	10.5	1.0	12.0	
			5.0±0.5	—	5.5	7.9	1.0	9.0	
Input Capacitance	C_{IN}	—	—	—	5	10	—	10	pF
Output Capacitance	C_{OUT}	—	—	—	10	—	—	—	
Power Dissipation Capacitance	C_{PD} 1	—	—	—	30	—	—	—	

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).

(2): * For TC74AC240 only.

* * For TC74AC241/244 only.