

# Octal buffer/line driver (3-State)

# 74ABT241

### FEATURES

- Octal bus interface
- 3-State buffers
- Output capability: +64mA/-32mA
- Latch-up protection exceeds 500mA per Jedec JC40.2 Std 17
- ESD protection exceeds 2000 V per MIL STD 883C Method 3015.6 and 200 V per Machine Model

### DESCRIPTION

The 74ABT241 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 74ABT241 device is an octal buffer that is ideal for driving bus lines. The device features two Output Enables (1OE, 2OE), each controlling four of the 3-State outputs.

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS $T_{amb} = 25^{\circ}\text{C}; \text{GND} = 0\text{V}$	TYPICAL	UNIT
$t_{PLH}$ $t_{PHL}$	Propagation delay An to Yn	$C_L = 50\text{pF}; V_{CC} = 5\text{V}$	2.9	ns
$C_{IN}$	Input capacitance	$V_I = 0\text{V or } V_{CC}$	4	pF
$C_{OUT}$	Output capacitance	$V_I = 0\text{V or } V_{CC}$	7	pF
$I_{CCZ}$	Total supply current	Outputs Disabled; $V_{CC} = 5.5\text{V}$	500	nA

### ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE
20-pin plastic DIP	-40°C to +85°C	74ABT241N
20-pin plastic SOL	-40°C to +85°C	74ABT241D

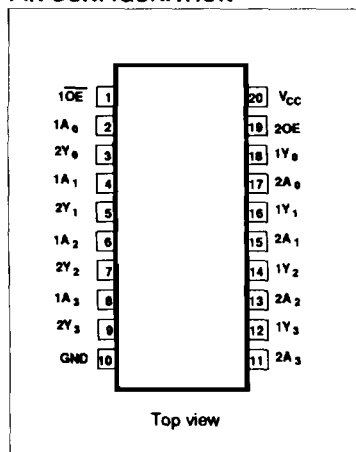
### FUNCTION TABLE

INPUTS				OUTPUT	
1OE	1An	2OE	2An	1Yn	2Yn
L	L	H	L	L	L
L	H	H	H	H	H
H	X	L	X	Z	Z

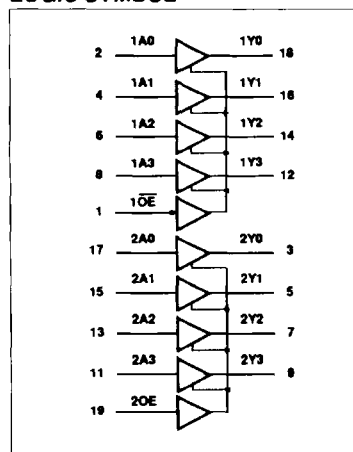
### PIN DESCRIPTION

PIN NUMBER	SYMBOL	FUNCTION
2, 4, 6, 8	1A0 - 1A3	Data inputs
17, 15, 13, 11	2A0 - 2A3	Data inputs
18, 16, 14, 12	1Y0 - 1Y3	Data outputs
3, 5, 7, 9	2Y0 - 2Y3	Data outputs
1, 19	1OE, 2OE	Output enables
10	GND	Ground (0V)
20	V <sub>CC</sub>	Positive supply voltage

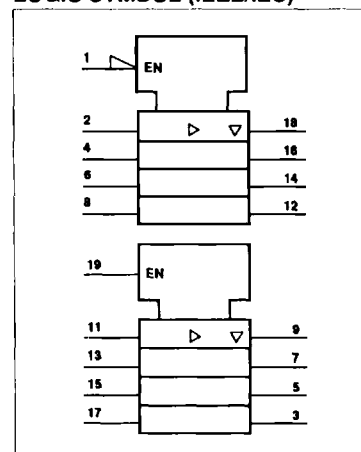
### PIN CONFIGURATION



### LOGIC SYMBOL



### LOGIC SYMBOL (IEEE/IEC)



## Octal buffer/line driver (3-State)

74ABT241

ABSOLUTE MAXIMUM RATINGS<sup>1, 2</sup>

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
$V_{CC}$	DC supply voltage		-0.5 to +7.0	V
$I_{IK}$	DC input diode current	$V_I < 0$	-18	mA
$V_I$	DC input voltage <sup>3</sup>		-1.2 to +7.0	V
$I_{OK}$	DC output diode current	$V_O < 0$	-50	mA
$V_{OUT}$	DC output voltage <sup>3</sup>	output in Off or High state	-0.5 to +5.5	V
$I_{OUT}$	DC output current	output in Low state	128	mA
$T_{stg}$	Storage temperature range		-65 to 150	°C

## NOTES:

- Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150°C.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS		UNIT
		Min	Max	
$V_{CC}$	DC supply voltage	4.5	5.5	V
$V_I$	Input voltage	0	$V_{CC}$	V
$V_{IH}$	High-level input voltage	2.0		V
$V_{IL}$	Input voltage		0.8	V
$I_{OH}$	High level output current		-32	mA
$I_{OL}$	Low level output current		64	mA
$\Delta V/\Delta t$	Input transition rise or fall rate	0	5	ns/V
$T_{amb}$	Operating free-air temperature range	-40	+85	°C

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## DC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT
			T <sub>amb</sub> = +25°C			T <sub>amb</sub> = -40°C to +85°C		
			Min	Typ	Max	Min	Max	
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = 4.5V; I <sub>IK</sub> = -18mA		-0.9	-1.2		-1.2	V
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = 4.5V; I <sub>OH</sub> = -3mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	2.5	2.9		2.5		V
		V <sub>CC</sub> = 5.0V; I <sub>OH</sub> = -3mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	3.0	3.4		3.0		
		V <sub>CC</sub> = 4.5V; I <sub>OH</sub> = -32mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	2.0	2.4		2.0		
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = 4.5V; I <sub>OL</sub> = 64mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		0.42	0.55		0.55	V
I <sub>I</sub>	Input leakage current	V <sub>CC</sub> = 5.5V; V <sub>I</sub> = GND or 5.5V		±0.01	±1.0		±1.0	µA
I <sub>OZH</sub>	3-State output High current	V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 2.7V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		5.0	50		50	µA
I <sub>OZL</sub>	3-State output Low current	V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 0.5V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		-5.0	-50		-50	µA
I <sub>O</sub>	Short-circuit output current <sup>1</sup>	V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 2.5V	-50	-100	-180	-50	-180	mA
I <sub>CCH</sub>	Quiescent supply current	V <sub>CC</sub> = 5.5V; Outputs High; V <sub>I</sub> = GND or V <sub>CC</sub>		0.5	50		50	µA
I <sub>CCL</sub>		V <sub>CC</sub> = 5.5V; Outputs Low; V <sub>I</sub> = GND or V <sub>CC</sub>		24	30		30	mA
I <sub>CCZ</sub>		V <sub>CC</sub> = 5.5V; Outputs 3-State; V <sub>I</sub> = GND or V <sub>CC</sub>		0.5	50		50	µA
ΔI <sub>CC</sub>	Additional supply current per input pin <sup>2</sup>	Outputs enabled, one input at 3.4V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5V		0.5	1.5		1.5	mA
		Outputs 3-State, one data input at 3.4V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5V		0.5	50		50	µA
		Outputs 3-State, one enable input at 3.4V, other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5V		0.5	1.5		1.5	mA

## NOTES:

- Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
- This is the increase in supply current for each input at 3.4V.

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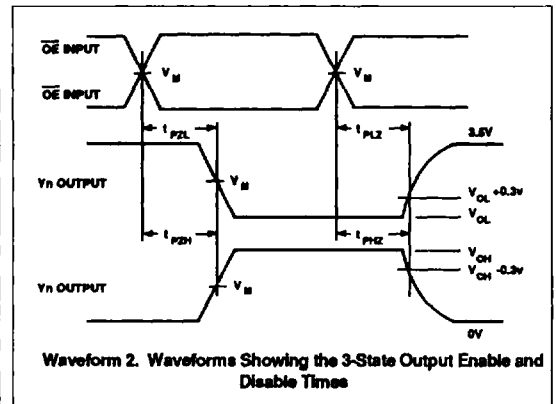
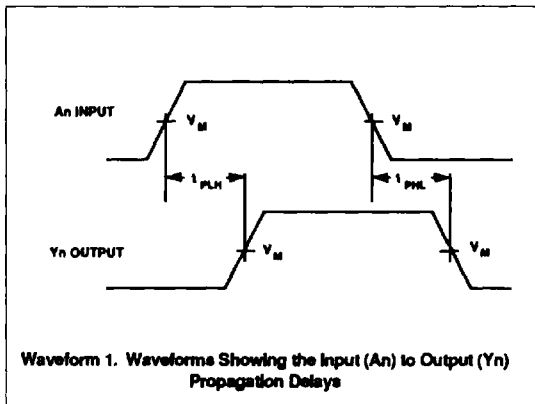
## AC CHARACTERISTICS

GND = 0V;  $t_R = t_F = 2.5ns$ ;  $C_L = 50pF$ ,  $R_L = 500\Omega$

SYMBOL	PARAMETER	WAVEFORM	LIMITS					UNIT
			$T_{amb} = +25^\circ C$ $V_{CC} = +5.0V$			$T_{amb} = -40^\circ C$ to $+85^\circ C$ $V_{CC} = +5.0V \pm 0.5V$		
			Min	Typ	Max	Min	Max	
$t_{PLH}$ $t_{PHL}$	Propagation delay An to Yn	1	1.0	2.6	4.1	1.0	4.6	ns
$t_{PZH}$ $t_{PZL}$	Output enable time to High and Low level	2	1.1	3.0	6.3	1.1	6.8	ns
$t_{PHZ}$ $t_{PLZ}$	Output disable time from High and Low level	2	1.6	4.6	6.1	1.6	7.1	ns
			1.0	3.9	5.4	1.0	5.9	

## AC WAVEFORMS

( $V_M = 1.5V$ ,  $V_M = GND$  to  $3.0V$ )



## TEST CIRCUIT AND WAVEFORMS

Test Circuit For 3-State Outputs

TEST	SWITCH
$t_{PLZ}$	closed
$t_{PZL}$	closed
All other	open

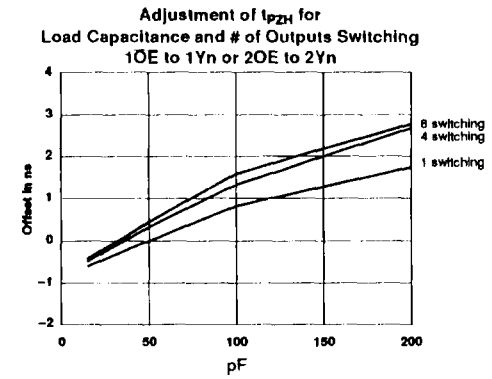
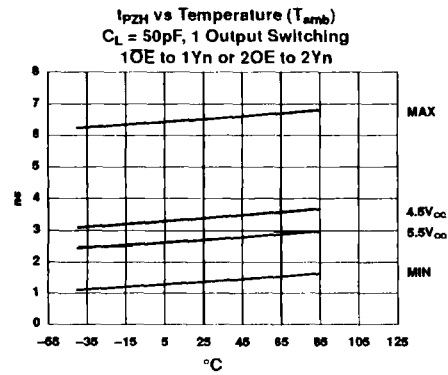
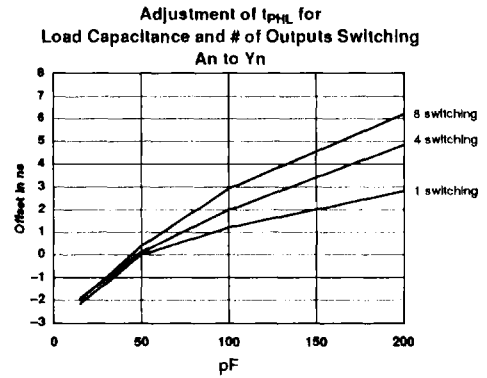
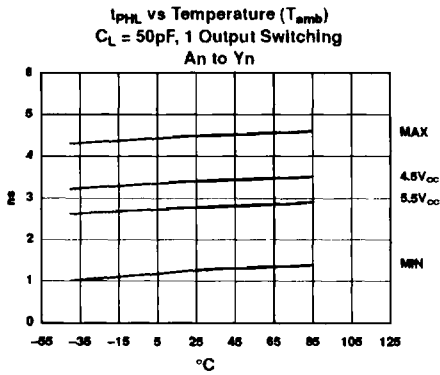
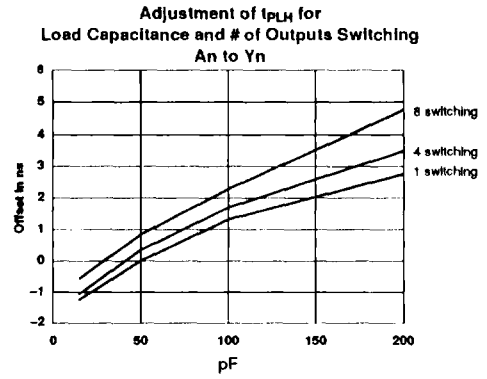
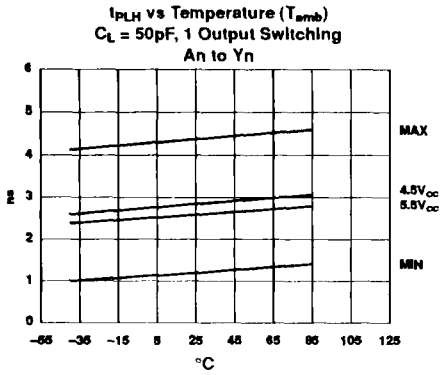
**DEFINITIONS**  
 $R_L$  = Load resistor; see AC CHARACTERISTICS for value.  
 $C_L$  = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.  
 $R_T$  = Termination resistance should be equal to  $Z_{OUT}$  of pulse generators.

$V_M = 1.5V$   
Input Pulse Definition

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	$t_w$	$t_R$	$t_F$
74ABT	3.0V	1MHz	500ns	2.5ns	2.5ns

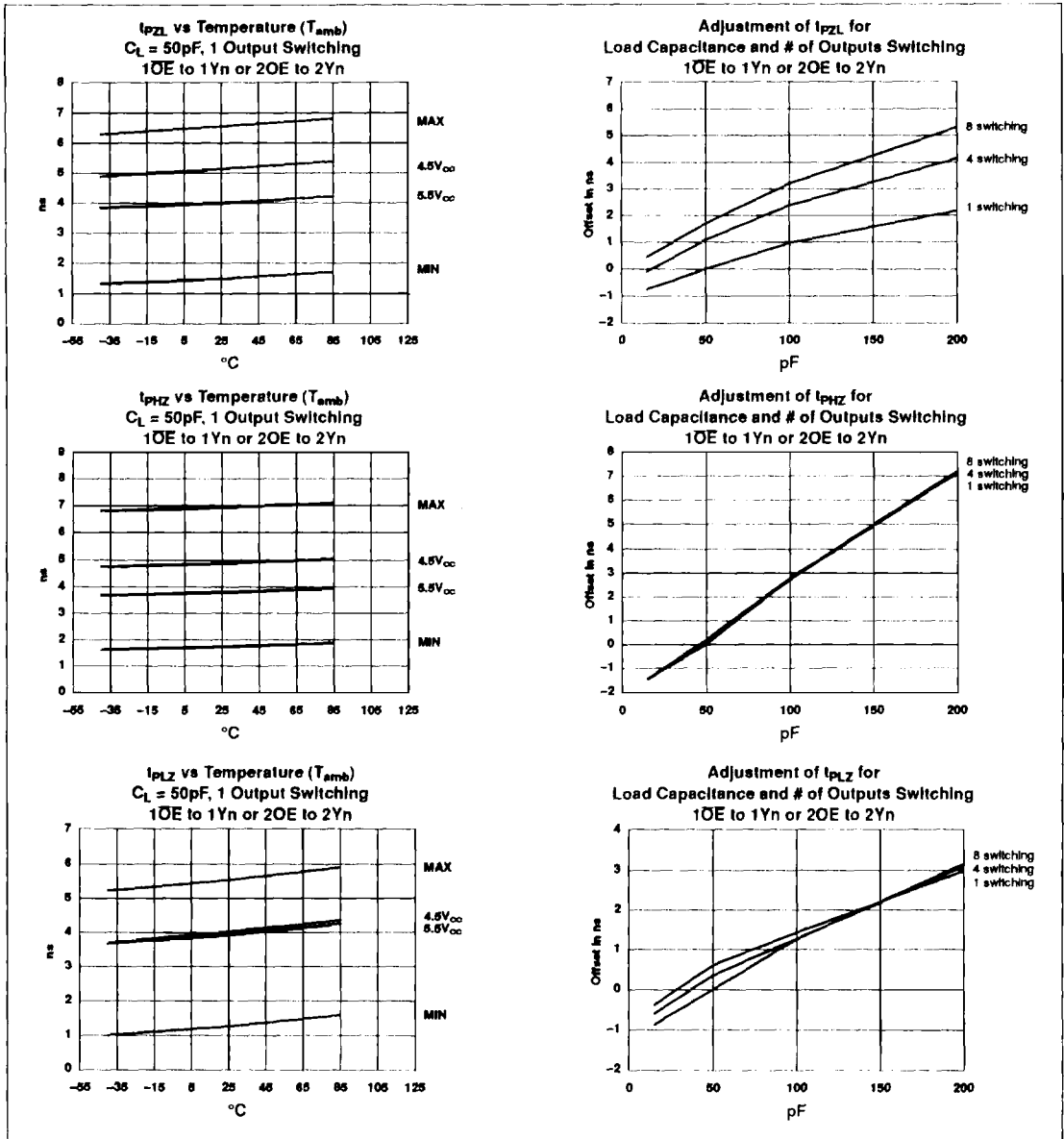
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