Octal buffer/line driver (3-State)

54ABT241

FEATURES

- Octal bus interface
- 3-state buffers
- Output capability: 48mA/-24mA
- Latch-up protection exceeds 500mA per JEDEC JC40.2 Std 17
- ESD protection exceeds 2000V per MIL STD 883 Method 3015 and 200V per Machine Model

DESCRIPTION

The 54ABT241 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 54ABT241 device is an octal buffer that is ideal for driving bus lines or buffer memory address registers. The device features two Output Enables ($1\overline{OE}$, 2OE), each controlling four of the 3-State outputs.

FUNCTION TABLE

INPUTS				OUTPUTS	
$1\overline{OE}$	1An	2OE	2An	1Yn	$\overline{2Yn}$
L	L	H	L	L	L
L	H	H	H	H	H
H	X	L	X	Z	Z

ORDERING INFORMATION

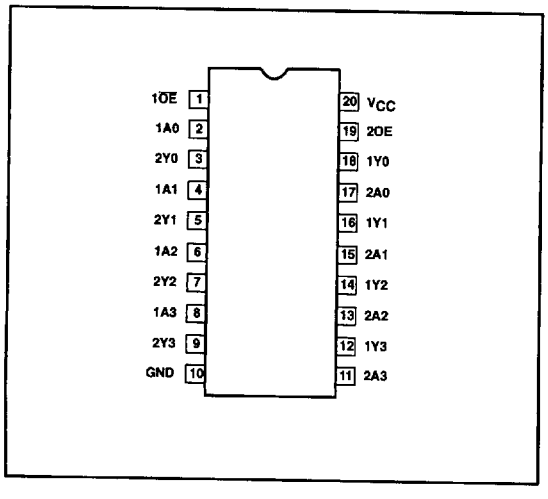
DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
20-Pin Ceramic DIP	54ABT241/BRA	GDIP1-T20
20-Pin Ceramic LLCC	54ABT241/B2A	CQCC2-N20

* MIL-STD 1835 or Appendix A of 1995 Military Data Handbook

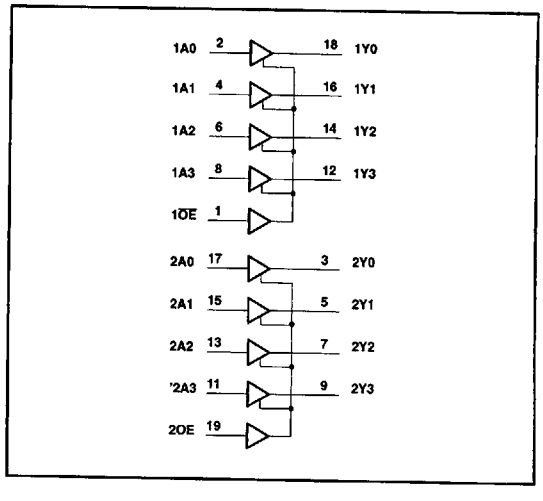
PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND 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	$1\overline{OE}$, 2OE	Output enables
10	GND	Ground (0V)
20	V_{CC}	Positive supply voltage

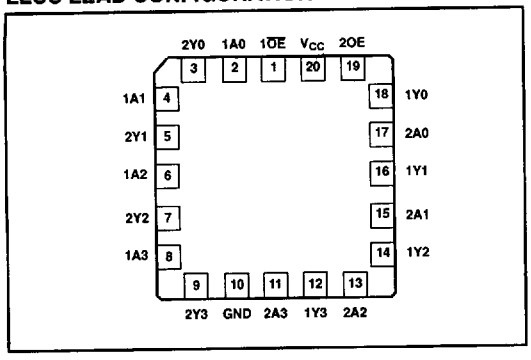
PIN CONFIGURATION



LOGIC SYMBOL



LLCC LEAD CONFIGURATION



ABSOLUTE MAXIMUM RATINGS[1]

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V_{CC}	DC supply voltage range		-0.5 to +7.0	V
I_{IK}	DC input diode current	$V_I < 0$	-18	mA
V_I	DC input voltage range[2]		-1.2 to +7.0	V
I_{OK}	DC output diode current	$V_O < 0$	-50	mA
V_O	DC output voltage range2	Output in Off or High state	-0.5 to +5.5	V
I_O	DC output current	Output in Low state	96	mA
T_{STG}	Storage temperature range		-65 to +150	°C

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}	Low-level input voltage		0.8	V
I_{OH}	High-level output current		-24	mA
I_{OL}	Low-level output current		48	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	0	5	ns/V
T_{amb}	Operating free-air temperature range	-55	+125	°C

DC ELECTRICAL CHARACTERISTICS

V_{CC} = MAX, V_I = V_{IL} or V_{IH} unless otherwise noted.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			T_{amb} = -55°C to +125°C			
			MIN	TYP[2]	MAX	
V_{IK}	Input clamp voltage	V_{CC} = 4.5V, I_I = I_{IK}			-1.2	V
V_{OH}	High-level output to voltage	V_{CC} = 4.5V; I_{OH} = -3mA	2.5			V
		V_{CC} = 4.5V; I_{OH} = -24mA	2.0	2.4		V
V_{OL}	Low-level output voltage	V_{CC} = 4.5V; I_{OL} = 48mA		0.42	0.55	V
I_I	Input leakage current	V_I = GND or 5.5V		±0.01	±1.0	µA
I_{OZH}[6]	3-State output High current	V_O = 2.7V, V_I = V_{IL} or 3.0V		5.0	10	µA
I_{OZL}[6]	3-State output Low current	V_O = 0.5V, V_I = V_{IL} or 3.0V		-5.0	-10	µA
I_O	Output current[4]	V_O = 2.5V, V_I = GND or V_{CC}	-50	-100	-180	mA
I_{CCH}	Quiescent supply current	Outputs High, V_I = GND or V_{CC}		50	250	µA
I_{CCL}		Outputs Low, V_I = GND or V_{CC}		24	30	mA
I_{CCZ}		Outputs 3-State, V_I = GND or V_{CC}		50	250	µA
ΔI_{CC}	Additional supply current per input pin[5]	Outputs enabled, one input at 3.4V, other inputs at V_{CC} or GND		0.5	1.5	mA
		Outputs 3-State, one data input at 3.4V, other inputs at V_{CC} or GND		0.5	50	µA
		Outputs 3-State, one enable input at 3.4V, other inputs at V_{CC} or GND		0.5	1.5	mA
I_{OFF}	Power OFF leakage current	V_{CC} = 0V, V_I or $V_O \leq$ 4.5V, T_A = 25°C only.	-100	1.0	100	µA
I_{CEX}	Output High leakage current	V_{CC} = 5.5V, V_O = 5.5V			50	µA

AC ELECTRICAL CHARACTERISTICS

GND = 0V, t_R = t_F = 2.5ns; C_L = 50pF, R_L = 500Ω

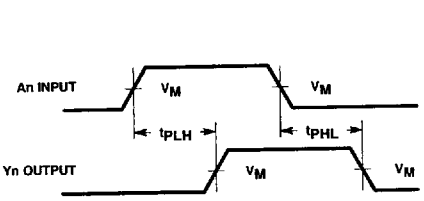
SYMBOL	PARAMETER	WAVEFORM	LIMITS					UNIT
			T_{amb} = +25°C V_{CC} = +5.0V			T_{amb} = -55°C to +125°C V_{CC} = +5.0V ± 0.5%		
			MIN	TYP	MAX	MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay An to Yn	Waveform 1	1.0 1.0	2.6 2.9	4.1 4.2	0.8 0.8	5.3 5.0	ns ns
t_{PZH} t_{PZL}	Output Enable time to High and Low level	Waveform 2	1.6 1.3	4.8 4.3	6.3 5.8	1.0 1.0	7.0 7.0	ns ns
t_{PHZ} t_{PLZ}	Output Disable time from High and Low level	Waveform 2	1.1 1.0	4.6 3.9	6.1 5.4	0.8 0.8	7.9 6.2	ns ns

NOTES:

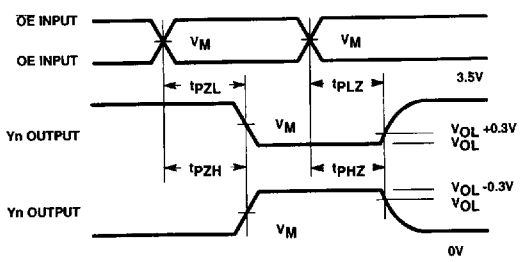
1. Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
2. 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.
3. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
4. Not more than one output should be tested at a time, and the4 duration of the test should not exceed one second.
5. This is the increase in supply current for each input at 3.4V.
6. To accommodate ATE tester limitations, I_{OZ} tests are tested with V_{IH} = 3.0V, but 2.0V V_{IH} is guaranteed.

AC WAVEFORMS

V_M = 1.5V, V_{IN} = GND to 3.0V

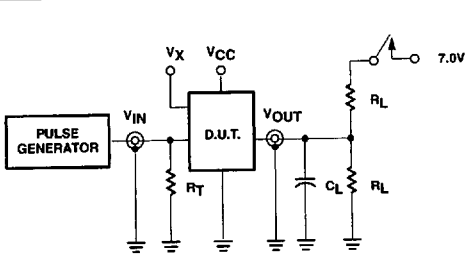


Waveform 1. Waveforms Showing the Input (An) to Output (Yn) Propagation Delays

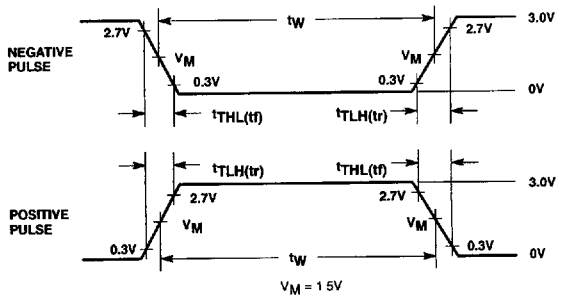


Waveform 2. Waveforms Showing the 3-State Output Enable and Disable Times

TEST CIRCUIT AND WAVEFORMS



Test Circuit for 3-State Outputs



Input Pulse Definitions

SWITCH POSITION

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

INPUT PULSE REQUIREMENTS					
Family	Amplitude	Rep. Rate	t_W	t_R	t_F
54ABT	3.0V	1MHz	500ns	2.5ns	2.5ns

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_X = Unclocked pins must be held at: ≤0.8V; ≥2.7V or open per Function Table.