

SN54BCT2244, SN74BCT2244 OCTAL BUFFERS AND LINE/MOS DRIVERS WITH 3-STATE OUTPUTS

SCBS017C – SEPTEMBER 1988 – REVISED NOVEMBER 1993

- State-of-the-Art BiCMOS Design Significantly Reduces I_{CCZ}
- Output Ports Have Equivalent 33- Ω Series Resistors, So No External Resistors Are Required
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic and Ceramic 300-mil DIPs (J, N)

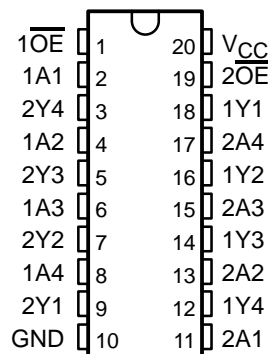
description

These octal buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the 'BCT2240 and SN74BCT2241, these devices provide the choice of selected combinations of inverting and noninverting outputs, symmetrical active-low output-enable (\overline{OE}) inputs, and complementary OE and \overline{OE} inputs. These devices feature high fan-out and improved fan-in.

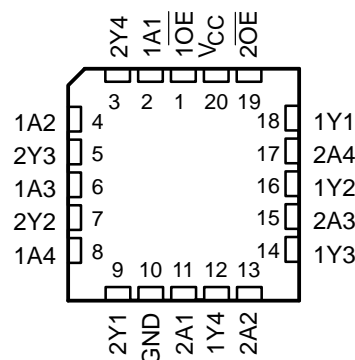
The outputs, which are designed to source or sink up to 12 mA, include 33- Ω series resistors to reduce overshoot and undershoot.

The SN54BCT2244 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74BCT2244 is characterized for operation from 0°C to 70°C .

SN54BCT2244 . . . J OR W PACKAGE
SN74BCT2244 . . . DW OR N PACKAGE
(TOP VIEW)



SN54BCT2244 . . . FK PACKAGE
(TOP VIEW)



FUNCTION TABLE
(each buffer)

INPUTS		OUTPUT Y
\overline{OE}	A	
L	H	H
L	L	L
H	X	Z

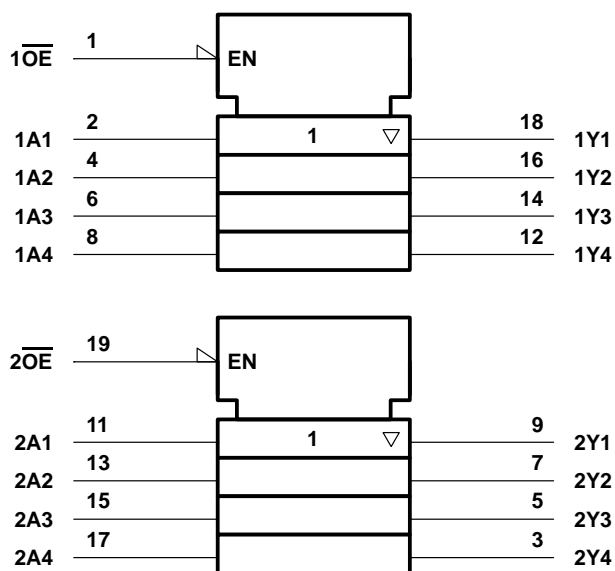
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OCTAL BUFFERS AND LINE/MOS DRIVERS

WITH 3-STATE OUTPUTS

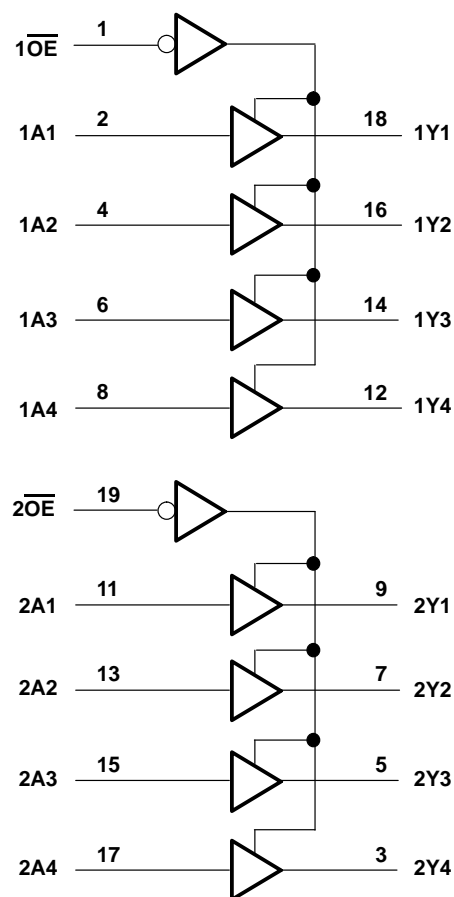
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logic symbol†

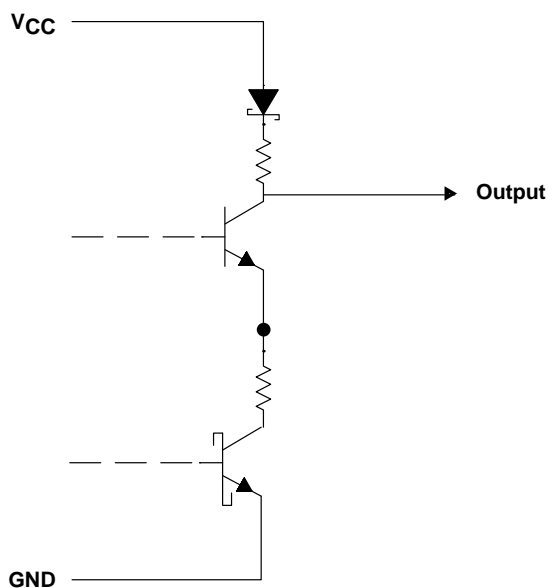


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



schematic of Y outputs



SN54BCT2244, SN74BCT2244 OCTAL BUFFERS AND LINE/MOS DRIVERS WITH 3-STATE OUTPUTS

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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V_{CC}	– 0.5 V to 7 V
Input voltage range, V_I (see Note 1)	– 0.5 V to 7 V
Voltage range applied to any output in the disabled or power-off state, V_O	– 0.5 V to 5.5 V
Voltage range applied to any output in the high state, V_O	– 0.5 V to V_{CC}
Input clamp current, I_{IK}	–30 mA
Current into any output in the low state	24 mA
Operating free-air temperature range: SN54BCT2244	– 55°C to 125°C
SN74BCT2244	0°C to 70°C
Storage temperature range	– 65°C to 150°C

[†] Stresses beyond those listed under “absolute maximum ratings” 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.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

recommended operating conditions

		SN54BCT2244			SN74BCT2244			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{IK}	Input clamp current			–18			–18	mA
I_{OH}	High-level output current			–12			–12	mA
I_{OL}	Low-level output current			12			12	mA
T_A	Operating free-air temperature	–55		125	0		70	°C

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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS		SN54BCT2244			SN74BCT2244			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5 \text{ V}$, $I_I = -18 \text{ mA}$				-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5 \text{ V}$	$I_{OH} = -1 \text{ mA}$		2.4			2.4		V
		$I_{OH} = -12 \text{ mA}$		2			2		
V_{OL}	$V_{CC} = 4.5 \text{ V}$	$I_{OL} = 1 \text{ mA}$		0.15	0.5		0.15	0.5	V
		$I_{OL} = 12 \text{ mA}$		0.35	0.8		0.35	0.8	
I_I	$V_{CC} = 5.5 \text{ V}$, $V_I = 7 \text{ V}$				0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5 \text{ V}$, $V_I = 2.7 \text{ V}$				20			20	μA
I_{IL}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0.5 \text{ V}$				-1			-1	mA
I_{OZH}	$V_{CC} = 5.5 \text{ V}$, $V_O = 2.7 \text{ V}$				50			50	μA
I_{OZL}	$V_{CC} = 5.5 \text{ V}$, $V_O = 0.5 \text{ V}$				-50			-50	μA
I_{OS}^\ddagger	$V_{CC} = 5.5 \text{ V}$, $V_O = 0$		-100		-225	-100		-225	mA
I_{CCH}	$V_{CC} = 5.5 \text{ V}$, Outputs open			23	37		23	37	mA
I_{CCL}	$V_{CC} = 5.5 \text{ V}$, Outputs open			53	77		53	77	mA
I_{CCZ}	$V_{CC} = 5.5 \text{ V}$, Outputs open			6.5	10		6.5	10	mA
C_i	$V_{CC} = 5 \text{ V}$, $V_I = 2.5 \text{ V}$ or 0.5 V			6			6		pF
C_o	$V_{CC} = 5 \text{ V}$, $V_O = 2.5 \text{ V}$ or 0.5 V			11			11		pF

† All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

‡ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L = 50 \text{ pF}$ (unless otherwise noted) (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$			SN54BCT2244		SN74BCT2244		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	0.5	3	4.4	0.5	5.2	0.5	4.9	ns
t_{PHL}			1.6	4.6	6.3	1.6	7.1	1.6	6.7	
t_{PZH}	\overline{OE}	Y	2.4	6.1	7.7	2.4	9.1	2.4	8.7	ns
t_{PZL}			3.9	7.6	9.4	3.9	10.8	3.9	10.4	
t_{PHZ}	\overline{OE}	Y	1.7	5.2	6.9	1.7	8.1	1.7	7.8	ns
t_{PLZ}			2.8	6.5	8.3	2.8	10.9	2.8	9.8	

NOTE 2: Load circuit and voltage waveforms are shown in Section 1.



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