- **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) and Shrink Small-Outline (DB) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic and Ceramic 300-mil DIPs (J, N)**

SN54BCT2240 . . . J OR W PACKAGE
SN74BCT2240 . . . DB, DW, OR N PACKAGE
(TOP VIEW)

1$\overline{OE}$	1	20 V_{CC}
1A1	2	19 2$\overline{OE}$
2Y4	3	18 1Y1
1A2	4	17 2A4
2Y3	5	16 1Y2
1A3	6	15 2A3
2Y2	7	14 1Y3
1A4	8	13 2A2
2Y1	9	12 1Y4
GND	10	11 2A1

SN54BCT2240 . . . FK PACKAGE
(TOP VIEW)

Pins (top): 2Y4, 1A1, 1$\overline{OE}$, V_{CC}, 2$\overline{OE}$ — positions 3, 2, 1, 20, 19

Left side: 1A2 (4), 2Y3 (5), 1A3 (6), 2Y2 (7), 1A4 (8)

Right side: 1Y1 (18), 2A4 (17), 1Y2 (16), 2A3 (15), 1Y3 (14)

Bottom: 2Y1 (9), GND (10), 2A1 (11), 1Y4 (12), 2A2 (13)
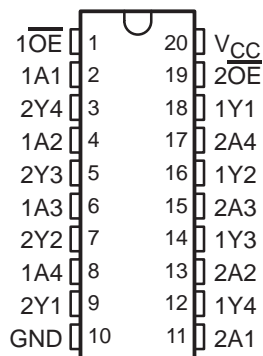
description

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 SN74BCT2241 and ′BCT2244, 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 ′BCT2240 is organized as two 4-bit line drivers with separate output-enable ($\overline{OE}$) inputs. When $\overline{OE}$ is low, the device passes data from the A inputs to the Y outputs. When $\overline{OE}$ is high, the outputs are in the high-impedance state.

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

The SN54BCT2240 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74BCT2240 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each buffer)

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

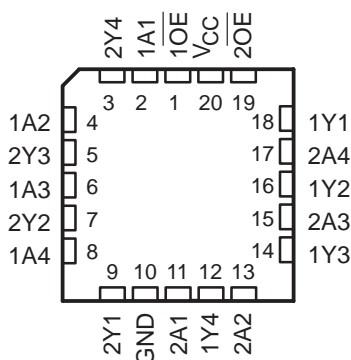Copyright © 1994, Texas Instruments Incorporated

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SN54BCT2240, SN74BCT2240
OCTAL BUFFERS AND LINE/MOS DRIVERS
WITH 3-STATE OUTPUTS
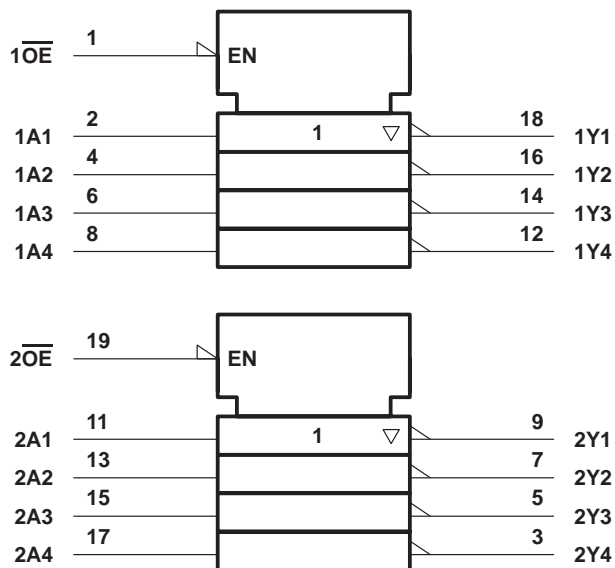
logic symbol†
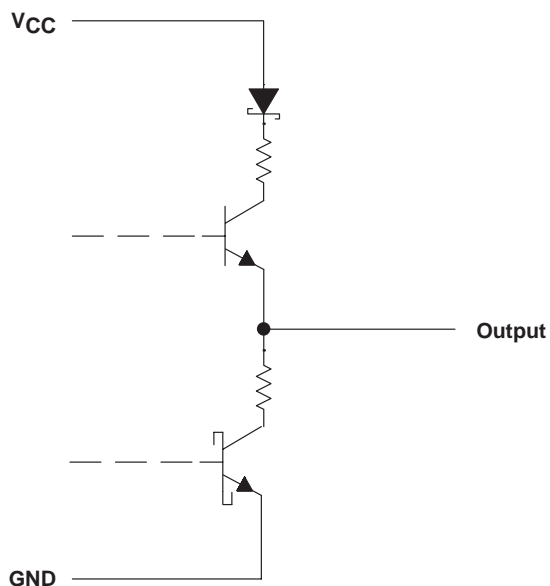

† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)

schematic of Y outputs

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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: SN54BCT2240 .... − 55°C to 125°C
SN74BCT2240 .... 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

		SN54BCT2240			SN74BCT2240			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

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

PARAMETER	TEST CONDITIONS		SN54BCT2240 MIN	SN54BCT2240 TYP†	SN54BCT2240 MAX	SN74BCT2240 MIN	SN74BCT2240 TYP†	SN74BCT2240 MAX	UNIT
V_{IK}	$V_{CC} = 4.5$ V,	$I_I = -18$ mA			−1.2			−1.2	V
V_{OH}	$V_{CC} = 4.5$ V	$I_{OH} = -1$ mA	2.4	3.3		2.4	3.3		V
		$I_{OH} = -12$ mA	2	3.2		2	3.2		
V_{OL}	$V_{CC} = 4.5$ V	$I_{OL} = 1$ mA		0.15	0.5		0.15	0.5	V
		$I_{OL} = 12$ mA		0.35	0.8		0.35	0.8	
I_I	$V_{CC} = 5.5$ V,	$V_I = 7$ V			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5$ V,	$V_I = 2.7$ V			20			20	µA
I_{IL}	$V_{CC} = 5.5$ V,	$V_I = 0.5$ V			−1			−1	mA
I_{OZH}	$V_{CC} = 5.5$ V,	$V_O = 2.7$ V			50			50	µA
I_{OZL}	$V_{CC} = 5.5$ V,	$V_O = 0.5$ V			−50			−50	µA
I_{OS}‡	$V_{CC} = 5.5$ V,	$V_O = 0$	−100		−225	−100		−225	mA
I_{CCH}	$V_{CC} = 5.5$ V,	Outputs open		19	32		19	32	mA
I_{CCL}	$V_{CC} = 5.5$ V,	Outputs open		46	76		46	76	mA
I_{CCZ}	$V_{CC} = 5.5$ V,	Outputs open		6	8		6	8	mA

† All typical values are at $V_{CC} = 5$ V, $T_A = 25°C$.
‡ 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, $C_L = 50$ pF (unless otherwise noted) (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5$ V, $T_A = 25°C$ MIN	TYP	MAX	SN54BCT2240 MIN	SN54BCT2240 MAX	SN74BCT2240 MIN	SN74BCT2240 MAX	UNIT
t_{PLH}	A	Y	0.5	3.4	4.8	0.5	6.3	0.5	5.7	ns
t_{PHL}			0.5	2.8	4	0.5	4.6	0.5	4.4	
t_{PZH}	$\overline{OE}$	Y	2.6	6.2	8.2	2.6	10.1	2.6	9.3	ns
t_{PZL}			4.3	8.8	10.9	4.3	12.9	4.3	12.4	
t_{PHZ}	OE	Y	2	5.3	7.1	2	9.2	2	8.7	ns
t_{PLZ}			2.2	6.7	8.5	2.2	12.2	2.2	10.6	

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

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