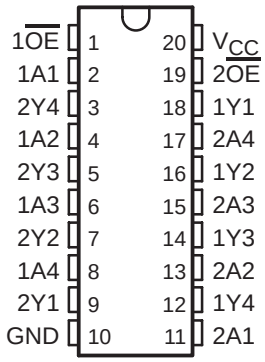
- **State-of-the-Art BiCMOS Design Significantly Reduces I_{CCZ}**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)**
- **Output Ports Have Equivalent 33-Ω Series Resistors, So No External Resistors Are Required**
- **High-Impedance State During Power Up and Power Down**
- **3-State Buffer-Type Outputs Drive Bus Lines Directly**
- **Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic 300-mil DIPs (N)**

DW OR N PACKAGE
(TOP VIEW)



description

The SN64BCT2240 is an inverting octal buffer and line/MOS driver 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 SN64BCT2241 and SN64BCT2244, these devices provide the choice of selected combinations of inverting outputs, symmetrical $\overline{OE}$ (active-low output-enable) inputs, and complementary OE and $\overline{OE}$ inputs. These devices feature high fan-out and improved fan-in.

When the output-enable ($1\overline{OE}$ and $2\overline{OE}$) inputs are low, the Y outputs reflect the inverse of the data present at the A inputs. When $1\overline{OE}$ and $2\overline{OE}$ are high, the outputs are in the high-impedance state. Output-enable $1\overline{OE}$ affects only the 1Y outputs; output-enable $2\overline{OE}$ affects only the 2Y outputs.

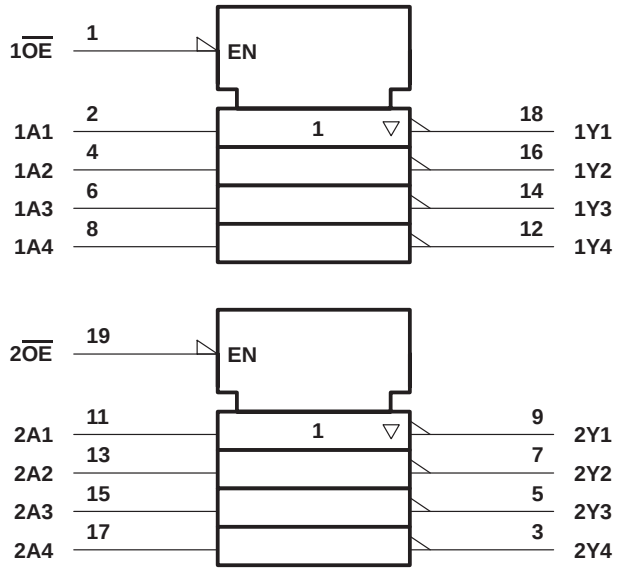
The outputs, which are designed to source or sink up to 12 mA, include 33-Ω series resistors to reduce overshoot and undershoot.

The SN64BCT2240 is characterized for operation from −40°C to 85°C and 0°C to 70°C.

FUNCTION TABLE
(each buffer)

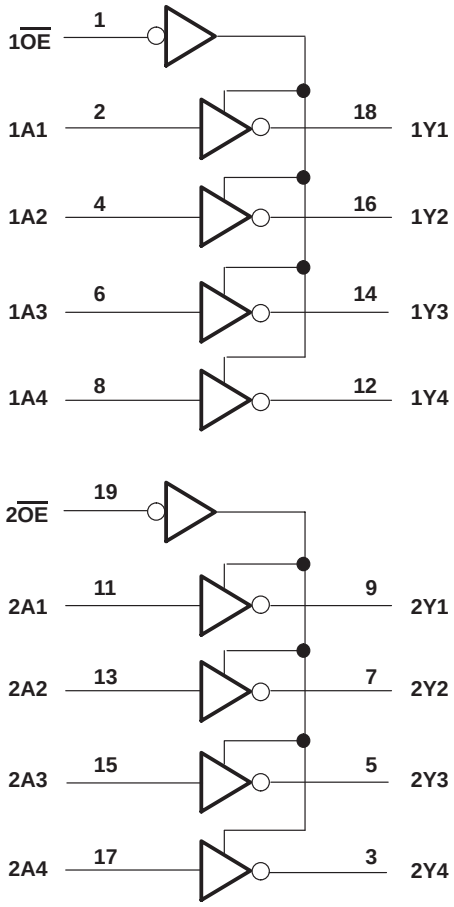
INPUTS		OUTPUT
$\overline{OE}$	A	Y
L	H	L
L	L	H
H	X	Z

logic symbol†

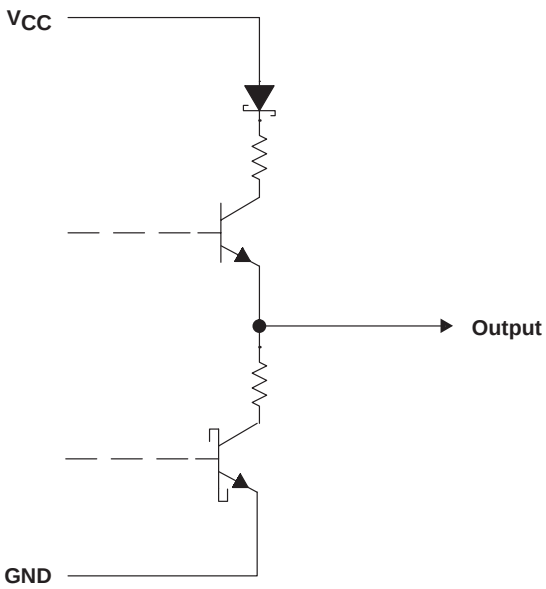


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



schematic of Y outputs



TEXAS INSTRUMENTS
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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} (V_I < 0) . . . . . −30 mA
Current into any output in the low state, I_O . . . . . 60 mA
Operating free-air temperature range . . . . . −40°C to 85°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 negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

recommended operating conditions (see Note 2)

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			V
V_{IL}	Low-level input voltage			0.8	V
I_{IK}	Input clamp current			−18	mA
I_{OH}	High-level output current			−12	mA
I_{OL}	Low-level output current			12	mA
$\Delta t/\Delta V_{CC}$	Power-up ramp rate	2			μs/V
T_A	Operating free-air temperature	−40		85	°C

NOTE 2: Unused or floating inputs must be held high or low.

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

PARAMETER	TEST CONDITIONS		MIN	TYP‡	MAX	UNIT
V_{IK}	V_{CC} = 4.5 V,	I_I = −18 mA			−1.2	V
V_{OH}	V_{CC} = 4.5 V	I_{OH} = −1 mA	2.4	3.3		V
		I_{OH} = −12 mA	2	3.1		
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 1 mA		0.15	0.5	V
		I_{OL} = 12 mA		0.15	0.8	
I_I	V_{CC} = 5.5 V,	V_I = 7 V			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			20	μA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.5 V			−1	mA
I_{OZ}	V_{CC} = 0 to 2.3 V (power up)	V_O = 2.7 V or 0.5 V, $\overline{OE}$ = 0.8 V			±50	μA
	V_{CC} = 1.8 V to 0 (power down)				±50	
I_{OZH}	V_{CC} = 5.5 V,	V_O = 2.7 V			50	μA
I_{OZL}	V_{CC} = 5.5 V,	V_O = 0.5 V			−50	μA
I_{OS}§	V_{CC} = 5.5 V,	V_O = 0	−100		−225	mA
I_{CCL}	V_{CC} = 5.5 V,	Outputs open		46	76	mA
I_{CCH}	V_{CC} = 5.5 V,	Outputs open		19	32	mA
I_{CCZ}	V_{CC} = 5.5 V,	Outputs open		6	8	mA
C_i	V_{CC} = 5 V,	V_I = V_{CC} or GND		6		pF
C_o	V_{CC} = 5 V,	V_O = V_{CC} or GND		11		pF

‡ 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 range of supply voltage, C_L = 50 pF (unless otherwise noted) (see Note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, T_A = 25°C			T_A = −40°C to 85°C		T_A = 0°C to 70°C		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
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}	$\overline{OE}$	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 3: Load circuits and voltage waveforms are shown in Section 1.

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