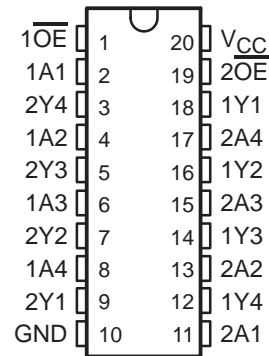


# SN54BCT244, SN74BCT244 OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

SCBS006E – OCTOBER 1987 – REVISED APRIL 1994

- State-of-the-Art BiCMOS Design Significantly Reduces  $I_{CCZ}$
- P-N-P Inputs Reduce DC Loading
- ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015
- 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)

SN54BCT244 . . . J OR W PACKAGE  
SN74BCT244 . . . DB OR DW OR N PACKAGE  
(TOP VIEW)



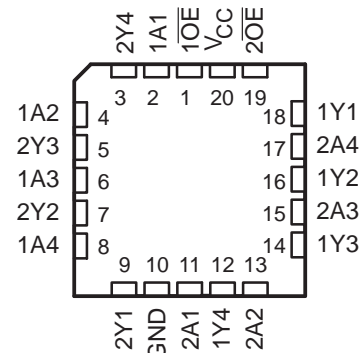
## description

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 'BCT240 and 'BCT241, these devices provide the choice of selected combinations of inverting and noninverting outputs, symmetrical  $\overline{OE}$  (active-low output-enable) inputs, and complementary OE and  $\overline{OE}$  inputs.

The 'BCT244 is organized as two 4-bit buffers/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 SN54BCT244 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74BCT244 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN54BCT244 . . . FK PACKAGE  
(TOP VIEW)



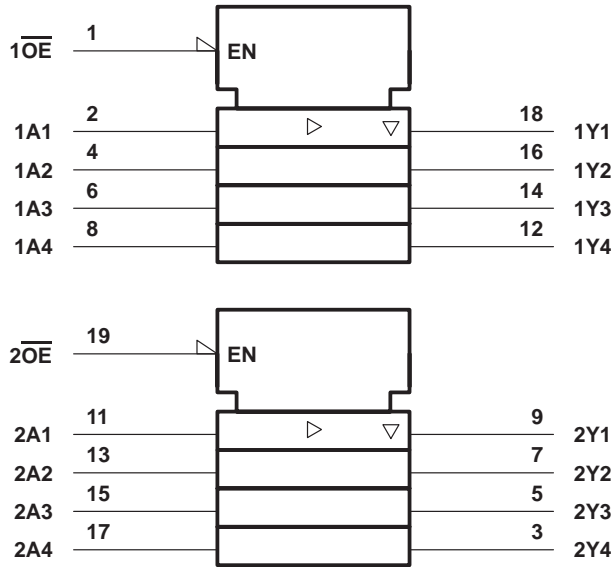
FUNCTION TABLE  
(each buffer)

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

# SN54BCT244, SN74BCT244 OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

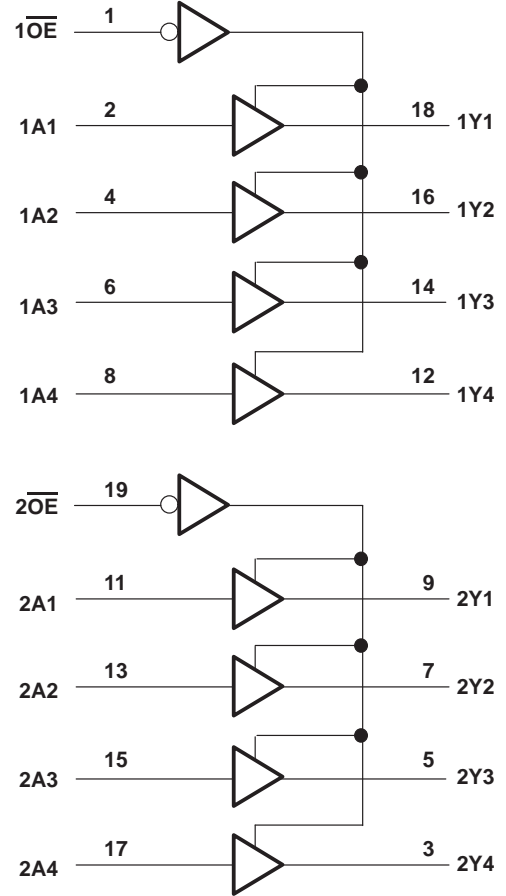
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## logic symbol†



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

## logic diagram (positive logic)



## 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, $V_{OH}$ .....	- 0.5 V to $V_{CC}$
Current into any output in the low state: SN54BCT244 .....	96 mA
SN74BCT244 .....	128 mA
Operating free-air temperature range: SN54BCT244 .....	- 55°C to 125°C
SN74BCT244 .....	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.

# SN54BCT244, SN74BCT244 OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

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## recommended operating conditions

		SN54BCT244			SN74BCT244			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			-15	mA
$I_{OL}$	Low-level output current			48			64	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	SN54BCT244			SN74BCT244			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
$V_{OH}$	$V_{CC} = 4.5\text{ V}$			2.4	3.3	2.4	3.3	V
				2	3.2			
						2	3.1	
$V_{OL}$	$V_{CC} = 4.5\text{ V}$			0.38	0.55			V
							0.42	
$I_I$	$V_{CC} = 5.5\text{ V}$ , $V_I = 7\text{ V}$			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
$I_{OS}‡$	$V_{CC} = 5.5\text{ V}$ , $V_O = 0$	-100		-225	-100		-225	mA
$I_{CCH}$	$V_{CC} = 5.5\text{ V}$ , Outputs open		23	40		23	40	mA
$I_{CCL}$	$V_{CC} = 5.5\text{ V}$ , Outputs open		53	80		53	80	mA
$I_{CCZ}$	$V_{CC} = 5.5\text{ V}$ , Outputs open		4	10		4	10	mA

† All typical values are at  $V_{CC} = 5\text{ V}$ .

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

# SN54BCT244, SN74BCT244 OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

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## switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = 25°C			V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX†				UNIT
			'BCT244			SN54BCT244		SN74BCT244		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	Y	1.2	2.5	4.4	0.9	5.3	0.9	5	ns
t <sub>PHL</sub>			1.7	3.2	5	1.4	6	1.4	5.5	
t <sub>PZH</sub>	$\overline{OE}$	Y	2	5.7	7.8	2	9	2	8.7	ns
t <sub>PZL</sub>			2	5.9	8.1	2	9.4	2	8.9	
t <sub>PHZ</sub>	$\overline{OE}$	Y	2	5.4	6.7	2	8	2	7.7	ns
t <sub>PLZ</sub>			2	6.1	7.6	2	9.8	2	8.9	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

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## SN54BCT244, Octal Buffers/Drivers With 3-State Outputs

DEVICE STATUS: **ACTIVE**

PARAMETER NAME	SN54BCT244	SN74BCT244
Voltage Nodes (V)	5	5
Vcc range (V)	4.5 to 5.5	4.5 to 5.5
Input Level	TTL	TTL
Output Level	TTL	TTL
No. of Outputs	8	
Output Drive (mA)		-15/64
tpd max (ns)		5.5
Static Current		60
Logic	True	

### FEATURES

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- State-of-the-Art BiCMOS Design Significantly Reduces  $I_{CCZ}$
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- ESD Protection Exceeds 2000 V  
Per MIL-STD-883C, Method 3015
- 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)

### DESCRIPTION

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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  $\overline{\text{BCT240}}$  and  $\overline{\text{BCT241}}$ , these devices provide the choice of selected combinations of inverting and noninverting outputs, symmetrical  $\overline{\text{OE}}$  (active-low output-enable) inputs, and complementary OE and  $\overline{\text{OE}}$  inputs.

The  $\overline{\text{BCT244}}$  is organized as two 4-bit buffers/line drivers with separate output-enable ( $\overline{\text{OE}}$ ) inputs. When  $\overline{\text{OE}}$  is low, the device passes data from the A inputs to the Y outputs. When  $\overline{\text{OE}}$  is high, the outputs are in the high-impedance state.

The SN54BCT244 is characterized for operation over the full military temperature range of -55°C to 125°C. The SN74BCT244 is characterized for operation from 0°C to 70°C.

### TECHNICAL DOCUMENTS

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To view the following documents, [Acrobat Reader 4.0](#) is required.

To download a document to your hard drive, right-click on the link and choose 'Save'.

### DATASHEET

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Full datasheet in Acrobat PDF: [sn54bct244.pdf](#) (73 KB, Rev. E) (Updated: 04/01/1994)

### APPLICATION NOTES

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[View Application Notes for Digital Logic](#)

- [Bus-Interface Devices With Output-Damping Resistors Or Reduced-Drive Outputs \(Rev. A\)](#) (SCBA012A - Updated: 08/01/1997)
- [Designing With Logic \(Rev. C\)](#) (SDYA009C - Updated: 06/01/1997)
- [Evaluation of Nickel/Palladium/Gold-Finished Surface-Mount Integrated Circuits](#) (SZZA026 - Updated: 06/20/2001)
- [Implications of Slow or Floating CMOS Inputs \(Rev. C\)](#) (SCBA004C - Updated: 02/01/1998)
- [Input and Output Characteristics of Digital Integrated Circuits](#) (SDYA010 - Updated: 10/01/1996)
- [Live Insertion](#) (SDYA012 - Updated: 10/01/1996)
- [TI IBIS File Creation, Validation, and Distribution Processes](#) (SZZA034 - Updated: 08/29/2002)
- [Understanding and Interpreting Texas Instruments Standard-Logic Products Data Sh \(Rev. A\)](#) (SZZA036A - Updated: 02/27/2003)

**MORE LITERATURE**

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- [Enhanced Plastic Portfolio Brochure](#) (SGZB004, 387 KB - Updated: 08/19/2002)
- [Logic Reference Guide](#) (SCYB004, 1032 KB - Updated: 10/23/2001)
- [MicroStar Junior BGA Design Summary](#) (SCET004, 167 KB - Updated: 07/28/2000)
- [Military Brief](#) (SGYN138, 803 KB - Updated: 10/10/2000)
- [Overview of IEEE Std 91-1984, Explanation of Logic Symbols Training Booklet \(Rev. A\)](#) (SDYZ001A, 138 KB - Updated: 07/01/1996)
- [Palladium Lead Finish User's Manual](#) (SDYV001, 2041 KB - Updated: 11/01/1996)
- [QML Class V Space Products Military Brief \(Rev. A\)](#) (SGZN001A, 257 KB - Updated: 10/07/2002)

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- [LOGIC Pocket Data Book](#) (SCYD013, 4837 KB - Updated: 12/05/2002)

**PRICING/AVAILABILITY/PKG**

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ORDERABLE DEVICE	STATUS	PACKAGE TYPE   PINS	TEMP (°C)	DSCC NUMBER	PRODUCT CONTENT	BUDGETARY PRICING QTY   SUS	STD PACK QTY	IN STOCK	IN PROGRESS QTY   DATE	LEAD TIME	DISTRIBUTOR COMPANY   REGION	IN STOCK	PURCHASE
5962-9062501M2A	ACTIVE	<a href="#">LCCC (FK)</a>   20	-55 TO 125		<a href="#">View Contents</a>	1KU   10.65	1	<a href="#">225*</a>	3770   20 May	8 WKS	<a href="#">Avnet</a>   Americas	6	<a href="#">BUY NOW</a>
									> 10k   27 May				
5962-9062501MRA	ACTIVE	<a href="#">CDIP (J)</a>   20	-55 TO 125		<a href="#">View Contents</a>	1KU   6.11	1	<a href="#">1161*</a>	> 10k   20 May	8 WKS	None Reported <a href="#">View Distributors</a>		
5962-9062501MSA	ACTIVE	<a href="#">CFP (W)</a>   20	-55 TO 125		<a href="#">View Contents</a>	1KU   11.44	1	<a href="#">398*</a>	> 10k   20 May	8 WKS	None Reported <a href="#">View Distributors</a>		
SNJ54BCT244FK	ACTIVE	<a href="#">LCCC (FK)</a>   20	-55 TO 125	5962-9062501M2A	<a href="#">View Contents</a>	1KU   10.65	1	<a href="#">1060*</a>	3889   20 May	8 WKS	<a href="#">EBV Electronik</a>   Europe	26	<a href="#">BUY NOW</a>
									> 10k   27 May				
SNJ54BCT244J	ACTIVE	<a href="#">CDIP (J)</a>   20	-55 TO 125	5962-9062501MRA	<a href="#">View Contents</a>	1KU   6.11	1	<a href="#">279*</a>	> 10k   20 May	8 WKS	<a href="#">EBV Electronik</a>   Europe	40	<a href="#">BUY NOW</a>
SNJ54BCT244W	ACTIVE	<a href="#">CFP (W)</a>   20	-55 TO 125	5962-9062501MSA	<a href="#">View Contents</a>	1KU   11.44	1	<a href="#">0*</a>	> 10k   20 May	8 WKS	<a href="#">EBV Electronik</a>   Europe	300	<a href="#">BUY NOW</a>

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